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HISTORY

OF

American Steam Navigation

BY

JOHN H. MORRISON.



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PREFACE.



It is not intended in this work to give the history of every steam vessel built in the United States, or of every line of steam vessels, for that would be an impossibility, as many of the records of the earlier vessels, as well as of the lines, are no longer in existence. Besides, many of the vessels have had no historical interest attached to them, being merely a duplicate in general of the vessels of the period: this could also be said of many vessels of a later date. The vessels named or historically noted are those that were a radical change either in hull or their machinery in their day, or were prominently connected with some of the lines that have come into notice during the development of our steam navigation interests, or had a reputation for high speed.

There has been every endeavor made to obtain accuracy in all matters of detail given in these pages, original papers being always consulted when such were to be obtained. But with all the care taken, perfection must not be expected in every line covering such a period of time, and especially when details were not always given the best of care for preservation. It is through private papers treating on these subjects under early dates that the history has been connected together over this brief space of time. It is only since 1870 that we have had marine and engineering journals devoted more exclusively to these subjects.

The rise and progress of American steam navigation has been a thing of very gradual development. Beginning with the experiments of John Fitch, who propelled his boat with vertically hung oars or paddles, we trace the trials made by Stevens and Livingston over a period of several years, with Oliver Evans, James Rumsey and others also trying to solve the problem of a successful steam vessel. But none of them were able to strike the happy combination of forces. That was left to Robert Fulton. After he had demonstrated the success of his plans through the building of the "Clermont," there were several who laid claims to parts of the combination used by him, and who endeavored to deprive him and those associated with him of the benefits of the enterprise, and he

was engaged up to the time of his death, in 1815, in law-suits to maintain the rights given him and others by the legislature of the State of New York. It was not until 1824 that the United States Supreme Court decided adversely to Fulton's associates upon the question of exclusive privilege.

After the decision of the United States Supreme Court a field was open for commercial enterprise that was taken advantage of, and the building of steam vessels for river service especially began to show a marked increase. Many improvements made at that time, though crude in their original form, were but the beginning of a more perfect and finished structure in later years.

After passing through many years with wooden-hull vessels, whose form, either for ocean or river service, could not be excelled by any nation of shipbuilders, we came in about 1870 to the period of a radical change from wooden to iron hulls—not but that many iron-hull vessels had been built in the United States prior to this date—but a more general adoption of iron for the purpose, and the substitution of the screw propeller for the side wheel, with the adoption of the compound engine for the simple engine in screw vessels. About fifteen years ago steel hulls and triple-expansion engines were introduced.

The furnishing and fitting of our steam vessels for passenger service has kept pace with the progress in the other departments of the vessel, so that now our passenger steamboats are really floating palaces. There will no doubt be marked advances along the same lines in the future, for the American public are never content to rest under present conditions.

The author fully appreciates the fact that in many instances he is running counter to generally accepted traditions of American steam navigation, but believes the facts warrant the conclusions arrived at.

The author desires to extend his grateful acknowledgment to his contributors for material placed at his service, as well as for their valued counsel. And to the *Nautical Gazette*, of New York, for the use of many of their cuts.

Brooklyn, N. Y.

J. H. MORRISON.

CHAPTER I.

EXPERIMENTAL STAGE.



THE first vessel moved by the power of steam on the waters of the United States was the invention of John Fitch, of Connecticut. At this time the manufacturing interests of the country, small as they were, cannot be said to have been in a very healthy condition, as the nation had but three years before emerged from a long and very exhaustive war with Great Britain, leaving them comparatively poor and with a heavy public debt to labor under. It was at about this period that several attempts were made in the United States to apply the steam engine to the propulsion of a vessel. There was not at this early date a steam engine in use for any practical purpose in this country, unless it was the atmospheric engine built by Josiah Hornblower for the Schuyler Copper Mines, in New Jersey, many years before Fitch's invention. There is thought to have been one of these atmospheric engines in New England at a date prior to the Revolutionary War.

Fitch's vessel is described by himself in a letter to the *Columbian Magazine* of December 8th, 1786 :—"The reason of my so long deferring to give you a description of the steamboat has been in some measure owing to the complication of the works, and an apprehension that a number of drafts would be necessary in order to show the powers of the machine as clearly as you would wish. But as I have not been able to hand you herewith such drafts, I can only give you the general principles. It is, in several parts, similar to the late improved steam engines in Europe, though there are some alterations. Our cylinder is to be horizontal, and the steam to work with equal force at each end. The mode by which we obtain what I take the liberty of terming a vacuum is, we believe, entirely new, as is also the method of letting the water into it and throwing it off against the

atmosphere without any friction. It is expected that the engine, which is a twelve-inch cylinder, will move with a clear force of eleven or twelve hundred weight, after the frictions are deducted. This force is to act against a wheel of eighteen inches diameter. The piston is to move about three feet, and each vibration of the piston gives the axis about forty revolutions. Each revolution of the axis moves twelve oars or paddles five and a half feet, which work perpendicularly and are represented by the stroke of the paddle of a canoe. As six of the paddles are raised from the water six more are entered, and the two sets of paddles make their strokes about eleven feet in each revolution. The cranks of the axis act upon the paddles about one-third of their length from the lever end, on which part of the oar the whole force of the axis is applied. Our engine is placed in the boat about one-third from the stern, and both the action and reaction turn the wheel the same way."

This boat was built by Brooks & Wilson, of Philadelphia, was 45 feet long and 12 feet beam, and was given a trial on August 22d, 1787, but was not able to make more than three miles an hour. In the same year, another and larger boat was constructed, being 60 feet long and 8 feet beam and 4 feet deep, and fitted with some of the machinery from the first boat. The oars of the old boat were dispensed with in the fitting of the new boat, the propelling apparatus being a system of paddles which were suspended from the upper ends of their shafts, and moved by a series of cranks, one to each, taking hold at the middle and giving them almost exactly the motion which is imparted by the Indian to his paddle when in his canoe. During the summer of 1788 they made a trip from Philadelphia to Burlington, on the Delaware River, at a slightly increased velocity over the former vessel, in three hours and twenty minutes. This vessel was named "Perseverance."

"These may certify that the subscriber has frequently seen Mr. Fitch's steam boat, which, with great labor and perseverance, he has at length completed: and has likewise been on board when the boat was worked against both wind and tide, with a very considerable degree of

velocity by the force of steam only. Mr. Fitch's merit in constructing a good steam engine, and applying it to so useful a purpose, will no doubt meet with the encouragement he so justly deserves from the generosity of his countrymen, especially those who wish to promote every improvement of the useful arts in America.

"Philadelphia, Dec. 12th, 1787.

"DAVID RITTENHOUSE."

"Having also seen the boat urged by the force of steam, and having been on board of it when in motion, I concur in the above opinion of Mr. Fitch's merits.

"JOHN EWING."

"From the well-known force of steam, I was one of the first of those who encouraged Mr. Fitch to reduce his theory of a steamboat to practice, in which he has succeeded far beyond my expectations.

"I am now fully of opinion that steamboats may be made to answer valuable purposes in facilitating the internal navigation of the United States: and that Mr. Fitch has great merit in applying a steam engine to so valuable a purpose, and entitled to every encouragement from his country and countrymen.

"Philadelphia, Dec. 13th, 1787.

"ANDREW ELLICOTT."

In 1789 another boat was built and fitted with more power than the previous ones had been, and during that year and that of 1790 it was tried on the Delaware River, and driven at the rate of eight miles an hour. This was named the "Thornton."

An account of some of the difficulties experienced by John Fitch and those interested with him in these experiments may be gathered in part from an article written by William Thornton, in October, 1815, entitled, "A Short Account of the Origin of Steamboats, by Dr. Thornton, Director of the Patent Office, Washington, D. C.": "Finding that Mr. Robert Fulton, whose genius and talents I highly respect, has been by some considered as the inventor of the steamboat,

I think it a duty to the memory of the late John Fitch to set forth, with as much brevity as possible, the fallacy of this opinion, and to show, moreover, that if Mr. Fulton has any claim whatever to originality in his steamboat, it must be exceedingly limited.

“In the year 1787 the late John Fitch applied for and obtained a patent for the application of steam to navigation in the States of Pennsylvania, New York, New Jersey, Delaware, etc., and soon after, the late James Rumsey, conceiving he had made some discoveries in perfecting the same, applied to the State of Pennsylvania for a patent; but a company formed by John Fitch under his State patents, of which the author of this was one of the principal shareholders, conceiving that the patent of Fitch was not for any peculiar mode of applying steam to navigation, but that it extended to all known modes of propelling boats and vessels, contested before the Assembly of Pennsylvania, and also before the Assembly of Delaware, the mode proposed by Mr. Rumsey, and contended that the mode he proposed, viz.: by drawing up the water into a tube and forcing the same water out at the stern of the vessel or boat, which was derived from Dr. Franklin’s works (the Doctor being one of his company), was a mode they (Fitch’s company) had a right to, for the plan was originally published in Latin about fifty years before in the works of Bournelli the younger; and two of Fitch’s company and I appeared, without counsel, and pleaded our own cause in the Assembly of Pennsylvania, and, after a week’s patient hearing against the most learned counsel of Pennsylvania, we obtained a decision in our favor, and afterwards also in Delaware. We believed and contended that our claim of propelling boats by steam included all the modes of propelling vessels and boats then known, and that the patent was for the application of steam as an agent to the propelling powers: and the decisions of the legislatures were in favor of this construction, as Mr. Rumsey’s company were excluded from the right of using steamboats on any principle.

“We worked incessantly at the boat to bring it to perfection, and some account of our labors may be seen in the “Travels of Brissot de Warville in the United States”; and under the disadvantages of never having seen a steam engine

on the principles contemplated, and of not having a single engineer in our company or pay, we made engineers of common blacksmiths, and after expending many thousand dollars, the boat did not exceed three miles an hour. Finding great unwillingness in many to proceed, I proposed to the company to give up to any one the one-half of my shares who would, at his own expense, make a boat go at the rate of eight miles an hour, in dead water, in eighteen months, or forfeit all the expenditures on failing: or, I would engage with any others to accept these terms. Each relinquished one-half his shares, making the forty shares eighty, and holding only as many of the new shares as he held of the old ones, and then subscribed as far as he thought proper to enter on the terms, by which many relinquished one-half. I was among the number who proceeded, and in less than twelve months we were ready for the experiment. The day was appointed and the experiment made in the following manner: A mile was measured in Front or Water street, Philadelphia, and the bounds projected at right angles as exactly as could be to the wharfs, where a flag was placed at each end, and also a stop-watch. The boat was ordered under way at dead water, or when the tide was found to be without movement: as the boat passed one flag, it was struck, and at the same instant the watches were set off: as the boat reached the other flag, it was also struck and the watches instantly stopped. Every precaution was taken before witnesses; the time was shown to all, the experiment declared to be fairly made, and the boat was found to go at the rate of eight miles per hour, or one mile within the eighth of an hour; on which the shares were signed over with great satisfaction by the rest of the company. It afterwards went eighty miles in one day.

“The Governor and Council of Pennsylvania were so highly gratified with our labors that, without their intentions being previously known to us, Governor Mifflin, attended by the Council in procession, presented to the company and placed in the boat a superb silk flag, prepared expressly, and containing the arms of Pennsylvania; and this flag we possessed till Mr. Fitch was sent to France by the company, at the request of Aaron Vail, Esq., our Consul at Lorient, who, being one of the company, was solicitous to have steamboats

built in France. John Fitch took the flag, unknown to the company, and presented it to the National Convention. Mr. Vail, finding the workmen all put into requisition, and that none could be obtained to build the boats, paid the expenses of Mr. Fitch, who returned to the United States; and Mr. Vail afterwards subjected to the examination of Mr. Fulton, when in France, the papers and designs of the steamboat appertaining to the company."

In March, 1786, Fitch received a grant from the legislature of New Jersey, and in March, 1787, from the legislature of New York, and about the same time from the legislatures of the States of Pennsylvania, Delaware, and Virginia, for fourteen years, for an "exclusive right to the use of fire and steam to navigation."

On June 22d, 1790, Fitch applied for a patent for forcing a column of air through a trunk or trunks filled with water, by the force of steam; for forcing a column of air through a trunk or trunks out at the stern with bow valves closed by the force of steam; and for applying the force of steam to cranks and paddles for propelling a vessel through the water, which patent was granted August 26th, 1791.

Improvement was suggested in almost every experiment, which occasioned him to make such frequent drafts for funds upon the company that their patience became exhausted, and the members despairing of final success, and being probably influenced by the popular want of confidence in the project, refused to advance any more money, and gradually they withdrew from the enterprise. The one Fitch most regretted to have withdraw his support was a watch and clock maker in Philadelphia, by the name of Voight, who had been of great assistance to him in his mechanical difficulties. The debts incurred by him on account of repairs for the boat, his inability to discharge them and to obtain the means to proceed with his experiments, obliged him finally to abandon the whole enterprise, after years spent in the greatest anxiety for its success and determination to bring it to a successful issue. His genius had to contend with his peculiar disposition and intemperate habits. He was ever groping in the dark, urged on by his impulses, and this subjected him to many disappointments. He accomplished more in propelling his

boat, crude as it was in almost every particular, than had ever been done before. But he was like many who followed him while trying to work out the problem, he fell short of introducing to the world a practicable mode of navigation by steam. In 1796 he made an experiment on a small body of water in New York City, known then as the Collect Pond, in the vicinity of where the Tombs now stands in Centre street. This body of water extended from where Pearl street now is to about White street, with Elm street on the west and what was known as Orange street on the east. There was an outlet for it both to the Hudson River by a course along where Canal street now lies, as well as by the East River, in the vicinity of Peck Slip. His experiments were here conducted in a common yawl boat, fitted with very crude machinery, and it is claimed that he made use of both sidewheels as well as a propeller in the stern of the boat, for propulsion in these experiments. But nothing appears to have been done but make several trials, and then the boat was laid aside.

This man of misfortune, after spending years in poverty and distress, took up his residence at Bardstown, Ky., where he died, about July 1st, 1798, from suicide.

In a collection of pamphlets on the steamboat case of 1815, there is a memorandum regarding John Fitch, by John C. Ward, who was related to Daniel Dod: "A person named Moore, with whom the writer formed an acquaintance in Norfolk, Va., in 1817, was personally acquainted with John Fitch, and described him as a visionary and reckless man, originally bred to the trade of watchmaker, fond of mechanics, dabbling in many new projects, and consequently remaining poor."

James Rumsey, a native of Maryland, and a strong competitor of John Fitch in the experimental stage of steam navigation, constructed, in 1784, a boat that was propelled by cranks and a series of "setting poles." This vessel was exhibited before General Washington, at Bath, Va., in September, 1784; but the project was soon abandoned. In 1787 he constructed a boat about fifty feet long, that was propelled by admitting water through a trunk on the keelson of the vessel, and by means of a steam pump discharging it at the stern.

This means of propelling a vessel has been of later years known as hydraulic propulsion, and has not proved a howling success in any regard, except for large expenditures of money. This boat of Rumsey's was never put to any practical use. Leaving the United States to his opponent, John Fitch, whose patents and privileges on steam navigation in the several States limited Rumsey's field of action, he sailed for London, where he built another vessel, but he died before its trial in 1793. A controversy was carried on between Rumsey and Fitch, in 1788, for the honor of the first discovery of the power of steam as applied to navigation. The disputed point appears to have been whether the first boat of Rumsey's was operated by steam or not. His interests while in Europe were in the care of the Rumesian Society of Philadelphia, Pa. The debate on the subject by the friends of the rival claimants has not been settled even to this day, as we find every few years some enthusiastic follower of one or the other side coming forward with "newly discovered evidence" to start the blaze of controversy on the subject anew. In this discussion between Fitch and Rumsey we find several who came forward and entered their claim to "having thought of" the subject of a steam engine prior to either of the former, and some had even ventured so far as to make drawings of a steam engine. But most of them only "thought of it," and that was as far as they got. They may have been cautious about bringing their advanced mechanical ideas to public notice, for fear of being robbed of their valuable discoveries.

To Oliver Evans belongs the credit of the first effective application of the high-pressure steam engine. It was while as an apprentice to a wheelwright, about 1772, that his attention was first called to the power of steam by an experiment that was made for amusement by some of his neighbors' sons, in filling a gun barrel with about a gill of water that was rammed down with a tight wad, having previously closed the fuse opening, after which they placed the breech end in the fire, when it soon discharged itself with a loud report. This experiment brought to his mind that here was the means of propelling a wagon independent of animal power. He made many trials and gave a great deal of time to study and thought on the subject, but the results gave varying success for sev-

eral years. In 1786 he petitioned the legislature of Pennsylvania for the exclusive right to use his improvements in flour mills, as well as steam wagons, in that State. The latter seems to have been his hobby, and he was considered to have the "steam mania" of those days. In the same year he endeavored to interest some parties in his steam engine for the purposes of navigation, but to no purpose. It was not until 1801 that he completed a small engine having a 6-inch cylinder and 18-inch stroke, costing him when he had completed his experiments several hundred dollars. This engine he used to grind plaster, and afterwards sawed marble, doing its work successfully.

X In the year 1802, Captain James McKeever, U. S. N., of Philadelphia, Pa., and Louis Valcourt, built a vessel in their joint interests, of 80-foot keel and 18-foot beam, in Kentucky, that was floated to New Orleans, and there fitted with an engine and boiler built by Oliver Evans. The cylinder of the engine was 9 inches diameter and 36 inches stroke, and boiler of the flue type of 42 inches diameter. The river having fallen so much before the completion of the vessel as to leave her high and dry, and the river not likely to rise sufficiently to float her for six months, the engine and boiler, etc., were taken out and set up in a saw-mill, where it operated until the mill was destroyed by fire. But for one of those unfortunate accidents which so often defeat the best-laid plans, Oliver Evans would no doubt have had the satisfaction of seeing one of his steam engines in successful operation on a steam vessel previous to those on the Hudson River. Mr. Stackhouse, who subsequently carried on the building of steam engines at Pittsburg, Pa., was one of the mechanics sent to New Orleans to erect the engine in the vessel. X

In 1804 he constructed, for the city of Philadelphia, a machine for dredging the slips of the city. The machinery was placed on a large scow, 30 feet long by 12 feet beam, with a steam engine 5 inches diameter of cylinder by 19 inches stroke, operating the machinery. When the boat and machinery were completed at the shop in Philadelphia, it furnished its own transportation to the Schuylkill River, wheels and axles having temporarily been fitted for the occasion, and when it was launched, a stern wheel was fitted, and with

its own power was driven down the Schuylkill to the Delaware River, and up the latter river, in all some fourteen or fifteen miles, thus clearly demonstrating the practicability of steamboats. In a patent suit in 1813, he says, regarding this dredge boat: "But in this I was sadly disappointed, for they made no allowance for the disproportion of the engine to its great load, nor for the temporary manner in which the machinery was fixed, nor the great friction, ill form of the boat, etc., but supposed it was the utmost I could do. Had I been patronized, as Mr. Fulton was, by the State of New York, with the exclusive right for thirty years, and by a Mr. Livingston with thirty thousand dollars, to make the experiment, I might have showed steamboats in full operation before Mr. Fulton began his boat, which was finished in 1807, twenty years after I petitioned the legislature of Pennsylvania, and three years after the mentioned experiment."

His son George Evans opened a shop in Pittsburg, Pa., in 1812—this was the next year after Fulton built the "New Orleans"—and, in 1816, built high-pressure engines for two western river boats—the "Franklin" and the "Oliver Evans."

The steamboats "Etna" and the "Pennsylvania," that run on the Delaware River about 1820, were each fitted with Evans high-pressure engines. Rush and Muhlenberg were his successors in business, and up till about 1840 were at the old works.

Oliver Evans was also the first who made use of the cylindrical-flue steam boiler.

Elijah Ormsbee, of Providence, R. I., about 1792, is said to have constructed a small engine that was placed in a boat and operated what were called goose-foot paddles, but after a few trials the affair was laid aside.

In March, 1798, Robert R. Livingston, by an Act of the New York legislature repealing an Act of 1787, "granting to John Fitch the sole right and advantage of making and employing the steamboat by him lately invented," was granted exclusive privilege of navigating the waters of the State with a vessel propelled by steam.

Livingston was a man of wealth as well as an inventor. Early in 1798 he was associated with Nicholas J. Roosevelt

and John Stevens, of Hoboken, N. J., building a boat on what was considered new principles, the engine for which was constructed by Roosevelt, and the propelling apparatus from designs by Livingston, which consisted of wheels with vertical axis, submerged at the stern. This vessel was ready for a trial during the summer of that year, but it failed to answer the expectations of its designers, the best speed attained being about three miles per hour. Other experiments were tried, one of which was in 1799 from a plan of John Stevens, of a set of paddles in the stern, with a crank motion, driving the boat forward as they rise and fall. This device of propelling the vessel was so severe upon the hull as to make it unfit for further experiments, and that plan was laid aside. Livingston and Stevens still continued their experiments, but with all the money at their command, did not find the simple propelling agency to bring them success. Their experiments came to an end for a time by the appointment of Robert R. Livingston as Minister to France in the fall of 1800 by President Jefferson.

The time allowed for exhibiting the proof required by the Act of 1798 having expired without its production, the legislature, on the 29th of March, 1799, on the petition of Nicholas J. Roosevelt, representing that he, with his associates, "had expended a very considerable sum of money in endeavoring to effect the objects of the said Act, but that, from various unavoidable accidents, he and his associates had not been able to comply with the conditions therein contained," and "praying that no advantage may be taken of their non-compliance with the conditions in the said law," passed an Act by which the law of 1798 was continued in force for twenty years from the following June 1st, provided that the several conditions were complied with, as in the Act of 1798, within two years of June 1st, 1799. Nothing appears to have been accomplished under this Act.

Livingston, while in France, met Robert Fulton, who had been engaged in experiments of steam navigation, among other things, while there, and in 1802-3 carried on several experiments on the River Seine, and in the summer of the latter year, made a trial with a boat propelled by paddle-wheels, which showed, with improvement in the engine, they

might look for much better results, although they had not succeeded in obtaining as high a rate of speed as was anticipated on this trial.

In this year (1803) Livingston wrote to friends in New York to have his privileges under the Act of 1798 restored to him and Fulton for twenty years, as they had been forfeited by his failure to comply with the conditions of the Act. The restoration of his privileges for twenty years was granted in an Act passed April 5th, 1803, giving them two years to comply with its conditions, which were practically the same as in the Act of 1798.

So impressed were Livingston and Fulton with the results of their experiments in France, that, in 1804, the latter made drawings of certain parts of a steam engine, which he gave to Boulton and Watt, of Birmingham, England, to make for them, with directions when they were completed to ship them to him at New York. Fulton was engaged at this time and up to late in 1806, in experimenting with a torpedo for submarine purposes, which he endeavored to have adopted by England and by France, when he returned home, where he arrived in December of that year.

The time for fulfilling the conditions of the Act of 1803 by Livingston and Fulton having previously expired, without proof of their ability to comply with its requirements, they made a further application for another extension, which was granted them in an Act dated April 5th, 1807, for the space of two years from that date. This made the second extension of time granted by the legislature to Livingston since the original exclusive privilege in 1798.

John Stevens' early attempts to propel a vessel by the agency of the steam engine appears to date from 1789, for in February of that year it is found that he laid before the legislature a petition relative to a steam engine to be placed on board a vessel. The next year, he laid before the Commissioners for the Promotion of Useful Arts descriptions of various improvements of the steam engine, among others being "A mode of propelling boats by steam": "The cylinder lies horizontally in the bottom of the boat, and near to each end of it are attached vessels somewhat more capacious than the cylinder itself, nearly filled with water or oil. Into each

of these vessels the steam from the boiler is alternately admitted and propels the water or oil into each end of the cylinder, and by this means the piston is driven backwards and forward by the action of the water or oil upon it. The piston being hollow, is made of the same specific gravity of the water or oil. The rod of the piston has a number of teeth which catch in the teeth of a small wheel, on the axis of which is fixed another large wheel, the teeth of which catch on each side into the teeth of two rods which pass through the stern of the boat, to the ends of which rods floats are fixed which operate as paddles to propel the boat through the water."

In 1791, Stevens commenced the building of an engine under this patent, and had it nearly completed when he was compelled to abandon the work, as the mechanic upon whom he relied for the execution of the work became unreliable from intemperate habits, and Stevens was not able to obtain another man capable of carrying forward the mechanical part of the enterprise.

Seven years appear to have elapsed before John Stevens takes any further active part in the development of steam navigation, and this time it is with Livingston and Roosevelt as before noted. The engine for this vessel was constructed by two of the best mechanics in the country at this time—Charles Stoudinger and Smallman—the latter having but a short time before been employed by Watt and Boulton. The patterns for this engine were made by John Hewitt, the father of the late Hon. Abram S. Hewitt, ex-Mayor of New York City. The engine was constructed, after their plan, at the works of Nicholas J. Roosevelt, at Belleville, on the Passaic River, near Newark, N. J., but a radical defect being found in its construction, it was laid aside. In 1802, Stevens then turned his attention to the rotary engine in operating a screw propeller, but, after many experiments, finally abandoned that project for the time, and returned again to the reciprocating engine in his experiments.

The experiments of John Stevens with the screw propeller, although the latter was not original with him, began in 1802, and was continued until some time in 1806. He made use of the four-bladed screw propeller; steam at a high pres-

sure for those days; the multi-tubular boiler; twin screws; and the quick-moving engine connected directly to the propeller shaft. There were no tools nor competent workmen to properly construct the steam engines and boilers he planned between 1802 and 1806, so success became impossible under these conditions. It will be noted that these experiments ceased just prior to Fulton commencing the construction of the "Clermont," and the better prospect of success through the use of the paddle-wheel caused Stevens to adopt that agent in his later experiments. The screw propeller was not used again as a means of propulsion until the "Robert F. Stockton," built in England by John Ericsson, and was brought to this country in 1839. A very clear history of these early experiments of John Stevens was given in a pamphlet on "The First Steam Screw Propeller Boats to Navigate the Waters of Any Country," issued some years ago.

A very good idea of the mechanical knowledge and skill in this country about the year 1800 may be derived from a report made in July, 1801, on the progress making in the Philadelphia pumping engines.

"The large cylinder is cast in two pieces and united by copper, the joint being secured externally by a strong iron band of cast iron, 18 inches broad and weighing 1,200 pds. 7,500 pds. of iron was used to make the cylinder: it is $6\frac{1}{2}$ ft. long and about $38\frac{1}{2}$ inches in the bore. About $\frac{3}{4}$ of an inch was first to be cut away. Two men are required; one almost lives in the cylinder, with a hammer in hand to keep things in order and attend to the steelings; the other attends to the frame on which the cylinder rests, which is moved by suitable machinery; these hands are relieved. The work goes on day and night. One man is also employed to grind the steelings: the work only stands at dinner and whilst the steelings are being changed, which requires about 10 minutes time, and in 10 minutes more are dull. I examined the same and found them worn $\frac{1}{8}$ of an inch in that time. Three steelings, which are about $3\frac{1}{2}$ inch on the edge are fixed in the head piece at one time: the head piece is a little less than the diameter of the cylinder and 6 inches thick, secured on a rod of iron 8-in. diameter, which forms the shaft of the water wheel. The workmen state that the boring was commenced on the 9th of

April and has been going on ever since, about 3 months, and that about 6 weeks more will be required to finish it. Eight or ten hands are employed on the fire box of the boiler; the wrought plates of which it is made are imported from England, about 38x32 in.; that made in this country is clumsy stuff, of different sizes, the largest being 36x18 in."

This cylinder, after all the labor expended upon it, proved to be $\frac{3}{8}$ -inch larger diameter in the middle of its length than it was at the ends.

"CLERMONT."

Robert Fulton, after his arrival home in 1806, commenced work on the hull of the first successful steamboat in the world, the contractor being Charles Brown, of New York. This ves-



NORTH RIVER STEAMBOAT OF CLERMONT.

sel was named the "North River Steamboat of Clermont." Charles Brown's shipyard was at this time on the East River, on what was an island surrounded by salt marshes, which extended from about the present Stanton street on the south to Third street on the north, and by Lewis street on the west, and on the east by the shore, where Mangin street now is. This was Manhattan Island.

The vessel was launched late in the spring of 1807, and it was not until the following August, after considerable delay, that the vessel was ready for a trial trip. Her dimensions were 140 feet long, 16 feet beam, and 7 feet depth of hold, with 28 inches draft of water. She was fitted with Watt & Bolten's engine, having a bell crank motion, with a cylinder of 24 inches diameter and 4 feet stroke of piston. There was one copper boiler 20 feet long, 7 feet diameter, and 8 feet wide. Water wheels, 15 feet diameter and 48 inches face; and main shaft of cast iron, $4\frac{1}{2}$ inches diameter. The length of this vessel has been given by some writers as 133 feet; that was probably the keel length.

The original enrollment of this vessel at the New York Custom House cannot be found. The enrollment of May 14th, 1808, after she was enlarged, is as follows, viz.:

"No. 108.

"Enrollment in conformity to an Act of the Congress of the United States of America entitled 'An Act for enrolling and licensing ships or vessels to be employed in the coasting trade and fisheries, and for regulating the same.'

"Robert R. Livingston, of Clermont,
Columbia County, State of New York,

having taken and subscribed to the oath required by the said Act, and having sworn that he, together with Robert Fulton, of the City of New York, are citizens of the United States, and sole owners of the ship or vessel called the North River Steamboat of Clermont, whereof Samuel Wiswall is at present master, and as he hath sworn he is a citizen of the United States, and that the said ship or vessel was built in the City of New York, in the year 1807, as per enrollment 173 issued at this port on the 3d day of September, 1807, now given up, the vessel being enlarged. And Peter A. Schenck, Surveyor of the Port, having certified that the said ship or vessel has one deck and two masts, and that her length is 149 feet,

" breadth " 17 " 11 inches,
" depth " 7 " .

and that she measures $132\frac{48}{95}$ tons. That she is a

square-sterned boat, has a square tuck:—no quarter galleries and no figure head.

“Hands and Seals, May 14th, 1808.”

An account of the trial trip is thus given by Cadwallader D. Colden, in his “Life of Robert Fulton,” 1817:

“Mr. Livingston and Mr. Fulton had invited many of their friends to witness the first trial: among them were the learned Drs. Mitchell and McNevin, to whom the country is indebted for some account of what passed on that occasion. Nothing could exceed the surprise and admiration of all who witnessed the experiment. The minds of the most incredulous, who had styled the boat ‘Fulton’s Folly,’ were changed in a few minutes. Before the boat had made the progress of a quarter of a mile, the greatest unbeliever must have been converted. The man who, while he looked on the expensive machine, thanked his stars that he had more wisdom than to waste his money on such idle schemes, changed the expression of his features as the boat moved from the wharf and gained her speed: his complacent smile gradually stiffened into an expression of wonder.

“The jeers of the ignorant, who had neither sense nor feeling enough to suppress their contemptuous ridicule and rude jokes, were silenced for a moment by a vulgar astonishment which deprived them of the power of utterance, till the triumph of genius extorted from the incredulous multitude which crowded the shores, shouts and acclamations of congratulation and applause.

“The boat had not been long under way when Fulton ordered her engine stopped. Though her performance so far exceeded the expectations of every other person, and no one but himself thought she could be improved, he immediately perceived that there was a defect in the construction of her water-wheels: he had their diameter lessened, so that the buckets took less hold of the water; and when they were again put in motion, it was manifest that the alteration had increased the speed of the boat.”

1807
This boat, on August 17th, sailed from a dock in New York City, near the State Prison, for Albany, on her first

voyage, and arrived at her destination without any accident. "She excited the astonishment of the inhabitants of the shores of the Hudson, many of whom had not heard of an engine, much less of a steamboat. There were many descriptions of the effects of her appearance upon the people on the banks of the river: some of these were ridiculous, but some of them were of such a character as nothing but an object of real grandeur could have excited. She was described by some who had indistinctly seen her passing in the night, to those who had not had a view of her, as a monster moving on the waters, defying the wind and tide, and breathing flames and smoke.

"She had the most terrific appearance from other vessels which were navigating the river when she was making her passage. The first steamboats, as others yet do, used dry pine wood for fuel, which sends forth a column of ignited vapor many feet above the flue, and whenever the fire is stirred, a galaxy of sparks flies off, and in the night have a very brilliant and beautiful appearance.

"This uncommon light first attracted the attention of the crews of other vessels. Notwithstanding the wind and tide were adverse to its approach, they saw with astonishment that it was rapidly coming towards them: and when it came so near as that the noise of the machinery and paddles were heard, the crews—if what was said in the newspapers of the time be true—in some instances shrunk beneath the decks from the terrific sight, and left their vessels to go on shore, while others prostrated themselves and besought Providence to protect them from the approaches of the horrible monster which was marching on the tides and lighting its path by the fires which it vomited."

Mr. Fulton was himself a passenger on this voyage, and, upon his return, published an account of his trip to Albany and return as follows:

NEW YORK, August 21st, 1807.

To the Editor of the *American Citizen*:

SIR,—I arrived this afternoon at 4 o'clock, in the steamboat from Albany. As the success of my experiment gives me great hopes that such boats may be ren-

dered of great importance to my country, to prevent erroneous opinions and give some satisfaction to the friends of useful improvements, you will have the goodness to publish the following statement of facts:

I left New York on Monday, at 1 o'clock, and arrived at Clermont, the country seat of Chancellor Livingston, at 1 o'clock on Tuesday—time, 24 hours; distance, one hundred and ten miles. On Wednesday I departed from the Chancellor's at 9 o'clock in the morning, and arrived at Albany at 5 o'clock in the afternoon—distance, 40 miles; time, 8 hours. The sum is, one hundred and fifty miles in thirty-two hours, equal to nearly five miles per hour.

On Thursday, at 9 o'clock in the morning, I left Albany, and arrived at the Chancellor's at 6 o'clock in the evening. I started from there at 7, and arrived at New York at 4 in the afternoon. Space run through, one hundred and fifty miles, equal to five miles an hour.

Throughout my whole way, both going and returning, the wind was ahead—no advantage could be derived from my sails—the whole has, therefore, been performed by the power of the steam engine.

I am, Sir, Your obt. servant,

ROBT. FULTON.

The following is an account of his trip to Albany and return, to his friend, Mr. Barlow: \

“My steamboat voyage to Albany and back has turned out rather more favorable than I had calculated. The distance from New York to Albany is one hundred and fifty miles: I ran it up in thirty-two hours, and down in thirty. I had a light breeze against me the whole way, both going and coming, and the voyage has been performed wholly by the power of the steam engine. I overtook many sloops and schooners beating to windward, and parted with them as if they had been at anchor.

“The power of propelling boats by steam is now fully proved. The morning I left New York there were not perhaps thirty persons in the city who believed that the boat would even move one mile per hour, or be of the least utility; and

while we were putting off from the wharf, which was crowded with spectators, I heard a number of sarcastic remarks. This is the way ignorant men compliment what they call philosophers and projectors.

"Having employed much time, money and zeal in accomplishing this work, it gives me, as it will give you, great pleasure to see it fully answer my expectations: it will give a quick and cheap conveyance to the merchandise on the Mississippi, Missouri, and other great rivers, which are now laying open their treasures to the enterprise of our countrymen; and, although the prospect of personal emolument has been some inducement to me, yet I feel infinitely more pleasure in reflecting on the immense advantage my country will derive from the invention."

About two weeks after the experimental trip to Albany, in August, the "Clermont" was advertised to sail between New York and the former city. A copy of a few of the notices in the daily papers at the time were as follows:

X Sept. 2d, 1807.

"The North River Steamboat will leave Paulus Hook ferry on Friday, 4th of September, at 6 in the morning, and arrive at Albany on Saturday in the afternoon. Provisions, good berths, and accommodations are provided.

"The charge to each passenger as follows:

"To Newburg.....3 Dolls.—Time, 14 hours.

" Poughkeepsie4 " — " 17 "

" Esopus4½ " — " 20 "

" Hudson5 " — " 30 "

" Albany7 " — " 36 " X

"For places, apply to Wm. Vandervoort, No. 48 Courtland street, on the corner of Greenwich street."

The notice of her first trip is given thus: "This morning (September 4th) at six o'clock Mr. Fulton's steamboat left the ferry stairs at Courtland street dock for Albany. We understand she had 24 passengers." The latter is an error, for the

passenger list consisted of 12 through passengers and 3 way passengers.

The following advertisement of Hudson River traveling by steamboats at this time will be interesting reading so far as time and accommodations are concerned:

STEAMBOAT.

For the Information of the Public.

The Steamboat will leave New York for Albany every Saturday afternoon exactly at 6 o'clock, and will pass

West Point	about 4 o'clock	Sunday morning.
Newburg	" 7 "	" "
Poughkeepsie	" 11 "	" "
Esopus	" 2 "	in the afternoon.
Red Hook	" 4 "	" "
Catskill	" 7 "	" evening.
Hudson	" 9 "	" "

She will leave Albany for New York every Wednesday morning exactly 8 o'clock, and pass

Hudson.....	about 3 o'clock	in the afternoon.
Esopus	" 8 "	" evening.
Poughkeepsie	" 12 "	" at night.
Newburg	" 4 "	Thursday morning.
West Point	" 7 "	" "

As the time at which the boat may arrive at the different places above mentioned may vary an hour more or less, according to the advantage or disadvantage of wind and tide, those who wish to come on board will see the necessity of being on the spot an hour before the time. Persons wishing to come on board from any other landing than those here specified, can calculate the time the boat will pass, and be ready on her arrival.

Innkeepers or boatmen, who bring passengers on board or take them ashore from any part of the river, will be allowed one shilling for each person.

Price of the passage—from New York

To West Point	\$2.50
“ Newburg	3.00
“ Poughkeepsie	3.50
“ Esopus	4.00
“ Red Hook	4.50
“ Hudson	5.00
“ Albany	7.00

From Albany

To Hudson	\$2.00
“ Red Hook	3.00
“ Esopus	3.50
“ Poughkeepsie	4.00
“ Newburg and West Point	4.50
“ New York	7.00

All the passengers are to pay at the rate of \$1.00 for every twenty miles, and half a dollar for every meal they may take.

Children from 1 to 5 years of age to pay half price, provided they sleep two in a berth, and whole price for each one who requests to occupy a whole berth.

Servants, who pay two-thirds price, are entitled to a berth; they pay half price if they do not have a berth.

Every passenger paying full price is allowed 60 pounds of baggage; if less than whole price, 40 pounds. They are to pay at the rate of 3 cents per pound for surplus baggage. Storekeepers, who wish to carry light and valuable merchandise, can be accommodated on paying 3 cents a pound.

Passengers will breakfast before they come aboard. Dinner will be served up exactly at 1 o'clock; tea, with meats, which is also supper at 8 o'clock in the evening; and breakfast at 9 o'clock in the morning. No one has a claim on the steward for victuals at any other time.”

Like all new inventions, her machinery was the subject of much care and attention for the first season, the weak points developing very quickly after the vessel was in service. The cast-iron shaft and the water-wheels were a constant source of trouble.

The "Clermont" continued to run during the remainder of the season on the same route, and during the winter was lengthened and given an increased beam. In the spring of 1808 she was again put on the route, where she continued to do service as a passenger boat until July, 1814, when withdrawn from further service, as the "Richmond" had been just completed.

As a further encouragement to the placing of steamboats upon the rivers of the State, the New York Legislature, on April 11th, 1808, passed a bill for the benefit, and at the same time for the protection, of the steam vessels belonging to Livingston and Fulton.

Livingston and Fulton afterwards built the following steam vessels for the Hudson River service, viz.:

"Car of Neptune," 1808; "Paragon," 1811; "Fire Fly," 1812; "Richmond," 1813-14.

The success of Robert Fulton appears to date from the time of the adoption of the side paddle wheels in his experiments. This means of propulsion had been on trial in this country prior to Fulton's use of them. They were tried on a small scale by Nathan Reed at Danvers, Mass., in 1789; by Samuel Morey, at Bordentown, N. J., in 1797; also by Nicholas J. Roosevelt, who was associated with Livingston and Stevens.

As there was no part of the original "Clermont" that was an invention of Robert Fulton, though he obtained patents at a subsequent date on improvements, his theoretical knowledge of steam navigation and its adaptation to practical purposes was the cause of his success. He knew very nearly all that had been done in the way of experiments, and his ability lay in selecting those features that were of value and bringing them together, so they were first seen in the "Clermont." He must certainly have had mechanical ability of no mean order for that day to have accomplished so much at one stroke. He found where changes could be made to advantage; but the location of the machinery in the vessel, so that it float on an even keel, was a great triumph for him. He, or his engineers, were fortunate in that regard. Builders of the present day, at times, have their own troubles in the proper distribution of the weights.

"PHENIX."

The small amount of information that has been handed down to us of this vessel, is very surprising, when we take into consideration that it was built just opposite New York City, and but a few months after the completion of the "Clermont." Probably the writers have given us all the data on the subject that was placed at their service, or to be obtained. There appear to be some differences between the accounts related by the best authorities and many facts regarding the vessel during the few years of its service, that seem to be irreconcilable. This was the second steam vessel in the United States, counting from the "Clermont" as the first vessel, and was the first of American build, of hull and machinery. Writers have named it as anywhere from the second to the seventh steam vessel in the United States.

The earliest writer that can be found, was Prof. James Renwick, of Columbia College, in 1830, who says:—"In the meantime Livingston's former associate, the elder Stevens, had persevered in his attempts to construct steamboats. In his enterprise he now received the aid of his son, and his prospects of success had become so flattering that he refused to renew his partnership with Livingston and resolved to trust to his own exertions. Fulton's boat was, however, first ready and secured the grant of the exclusive privilege of the State of New York. The Stevens were but a few days later in moving a boat with the required velocity, and as their experiments were conducted separately, have an equal right to the honors of invention with Fulton. Being shut out of the waters of the State of New York by the monopoly of Livingston and Fulton, Stevens conceived the bold design of conveying his boat to the Delaware by sea, and this boat, which was so near reaping the honor of first success, was the first to navigate the ocean by the power of steam."

Then Prof. Charles King, also of Columbia College, in a lecture on the "Progress of New York City," in 1851, says of this vessel: "The palm thus gained by Fulton was closely contested by John Stevens, of Hoboken, N. J., who, long in concert with R. R. Livingston, had made experiments in steam as a means of propulsion, but now, aided by the genius and

practical and mechanical skill of his son, Robert L. Stevens, was operating separately. Almost simultaneously, but yet behind by that fatal quarter of an hour which determined the fate of so many enterprises and so many human beings, both men and women, Mr. Stevens produced independently of Fulton's plans and experiments, his steamboat "Phenix," but, precluded by the monopoly which Fulton's success had obtained for him of the waters of New York, Mr. Stevens first employed her as a passage boat between this city and New Brunswick, and finally conceived the bold purpose of sending her around to Philadelphia by sea: and he executed it successfully. His son, Robert L. Stevens, went around with the boat in the month of June, 1808. A fierce storm overtook them. A schooner in company was driven out to sea and was absent many days, but the "Phenix" made a safe harbor at Barnegat, whence, when the storm abated, she proceeded safely to Philadelphia and plied many years between that city and Trenton." He also said, "that hollow and concave water lines in the bow were introduced for the first time in the steamboat "Phenix." It were as well if the speaker had left this out, with some of his other claims.

C. Elfreth Watkins, C. E., in 1892, in a paper on "John Stevens and his Sons," says of Robert L. Stevens: "He took the "Phenix" from New York to Philadelphia by sea in June, 1808. The "Phenix" was the first steamboat to navigate the ocean."

Frank B. Stevens, 1893, in his paper on "The first steam-screw propeller boats to navigate the waters of any country," says of John Stevens: "He was engaged in building the "Phenix" when Fulton arrived from Europe with the engine made for him by Watt, in 1806, which, complete in all its details, and in these respects far in advance of any engine that could then have been built in this country, achieved success."

"Fulton's engine was the first rotative steam engine that was allowed to be exported from England."

"The paddle-steamer "Phenix" was completed a few weeks after Fulton's vessel; and as she was debarred from navigating the waters of the Hudson by the monopoly given to Fulton by the legislature of the State of New York, she was sent by

sea to Philadelphia. The "Phenix" was the first steamboat that navigated the ocean."

These quotations will be recognized as from authorities of undoubted ability and reputation to speak on the subject. It will be noted how limited in the scope and how general in the terms they have treated the subject.

Let us now examine some of the records of this early period, so far as relates to this vessel.

In January, 1812, there was a paper published in a New York medical journal as a "Historical account of the application of steam for the propulsion of Boats," in which the writer says: "Not long after John Stevens, Esq., of Hoboken, engaged in the same pursuit, tried elliptical paddles, smoke-jack wheels, and a variety of other ingenious contrivances, sometimes of his own invention, and again in conjunction with Mr. Kinsley, late one of our most distinguished mechanics. None of these having been attended with the desired effect, Mr. Stevens has, since the introduction of Messrs. Livingston and Fulton's boat, adopted their principles and built two boats that are propelled by wheels to which he has added a boiler of his invention that promises to be a useful improvement on engines designed for boats."

John Stevens, in 1814, replied to this paper, so far as it related to his steamboat experiments, and says in part: "It is very true that I now make use of water wheels on each side of the boat. It is surely very far from my intention to make any attempt to invalidate Mr. Fulton's claim to water wheels thus applied. It is an unquestionable fact that he was the first person who, for any practical useful purpose, applied water wheels on each side of a steamboat.

"It may not be amiss to mention that in the year 1807, when the North River Steamboat made her first appearance on the waters of the Hudson, I constructed an engine and boat on a very small scale, viz.: fifteen feet long, and four and a half feet wide. To this boat, considering her size, I gave a most astonishing velocity. At times not less than six miles an hour. To be sure, she had water wheels on each side. But that this extraordinary velocity was not altogether owing to this circumstance is evident from the fact of her going,

notwithstanding every disadvantage, much faster than the North River Steamboat. Mr. Fulton has, however, incontestably the merit of being the first person who applied steamboats to useful purposes."

This letter of John Stevens shows that he built, *after the "Clermont" was in service*, a small experimental vessel with side wheels, but makes no reference to a larger vessel that he had constructed at this time with side wheels. Nor is there in the letter any data of the "Phenix's" original construction.

We learn nothing further, or, it may more properly be said, the first we learn, so far as the light of the records at present reveals, is that John Stevens, on October 20th, 1808, issues a proposal for the formation of a company to run a steamboat from New York to New Brunswick. In this proposal he states that he has a steamboat that made a trial trip on the 27th of September previous. It is given in full and throws a great deal of light into the darkness that has surrounded this vessel. And coming from the owner, it cannot be denied.

A STEAMBOAT

from New York to New Brunswick, and from Trenton to Philadelphia.

Proposal.

The application of steam to propelling vessels has been the favorite object of the subscriber for upwards of twenty years past. It is unnecessary now to go into any detail of the very numerous experiments he has made with a view of effecting his purpose. Suffice it to say, that the result of so many years' unremitting attention, and an expenditure in money far beyond the bounds of credibility, has at length terminated in success: in the complete attainment of his object.

That the public may feel proper confidence in the competency of the subscriber to carry into effect the objects embraced in these proposals, he begs leave to state the performance of a steamboat he has built with a view to the navigation of the North River, in a voyage he made to Perth Amboy.

She left Hoboken at about half-past 12 o'clock on Tuesday, the 27th of September, but owing to repeated delays for

adjusting various parts of the machinery, a very strong head wind, and a heavy swell in the bay, and adverse tides, did not reach Perth Amboy till a quarter after seven. The next morning she left Perth Amboy precisely at half-past 12 o'clock.

Passed by mouth Elizabeth T. Creek, 56 minutes after 2			
"	" Church on Staten Island..	50	" " 3
"	" Bergen Point.....	50	" " 4
"	" Bedloes Island	30	" " 5
"	" Paules Hook	6	" " 6
"	" Hoboken	18	" " 6

Distance from Perth Amboy to Paules Hook, 30 miles; time, 5 hours and 35 minutes, which is more than $5\frac{1}{2}$ miles an hour.

Were his individual funds adequate to the completion of the object of the proposals, it would manifestly be his interest to retain the whole in his own hands. But he is induced by another consideration to make the following proposals. He wishes to engage as many of his fellow-citizens as possible to embark in the undertaking, in order that they may feel a warm interest in the promotion of an object of so great public utility.

The subscriber will oblige himself to build a vessel of 100 feet keel and 16 feet beam, of the best materials, which shall possess every convenience and accommodation requisite for a passage boat between New York and New Brunswick, on board of which he will place a steam engine which shall give her a velocity of at least five miles an hour, but probably much more.

He will also contract that she shall be completed in every respect as a passage boat on or before the first day of May next.

The subscriber estimates from the most correct information that the number of passengers to and from New York and New Brunswick will exceed fifty each way. But the ratio of increase, which may reasonably be expected in the course of a few years, will probably exceed the most sanguine expectations.

100 passengers, averaged at \$1.25, would be per day..	\$125.00
The steamboat from New York to Albany requires from 12 to 14 loads of pine wood to perform the passage; the distance from New York to New Brunswick and back again is little more than one half the distance from New York to Albany; say then that 8 loads per day of pine wood will be required, which, at 10s. per load, is.....	\$10.00
Two Firemen and two Sailors, at 10s. per day, is.	5.00
Captain, per day, say.....	3.00
Extra expenses, say.....	7.00
	<hr/> \$25.00
Clear profit per day.....	\$100.00

Supposing the navigation is interrupted for 60 days during the winter season, and other interruptions should amount to 55 days more, there would then remain 250 days which, at \$100 per day, is \$25,000 per annum.

In this estimate no account is made for way passengers from South Amboy, Perth Amboy, Rahway, Elizabethtown, Staten Island, etc., etc., which, no doubt, would be very considerable. We will, however, estimate the whole at only \$5,000, which may be placed against the necessary repair of the boat and engine.

By this estimate, then, assuming the capital to be equal to \$75,000, it would yield a neat return of $33\frac{1}{3}$ per cent. per annum, which may be paid quarterly, or even monthly, to the stockholders.

This capital the subscriber proposes to divide into 1000 shares at \$75 per share, and that subscribers may be secured from all possibility of loss, the subscriber will warrant the payment of 8 per cent. per annum, in half-yearly payments, to any and every subscriber who will release to him one-half of the neat revenue on each share exceeding 8 per cent. per annum.

The subscriber proposes opening a subscription for 250 shares in the following manner: On Tuesday, the 25th of October, at 12 o'clock, at the house of Abraham Degraw, in

the City of New Brunswick, he will open a subscription for 100 shares.

In like manner he proposes opening a subscription at the Tontine Coffee House, in the City of New York, at 12 o'clock on Friday, the 28th October, for 150 shares. Ten dollars of the subscription money to be paid at the time of subscribing, when proper certificates will be given.

15 dollars on the 5th day of December next.

15 " " " 1st " " January "

15 " " " 1st " " February "

10 " " " 5th " " March "

10 " " " 1st " " April "

On failure of payment of said installments when they shall severally become due, the subscriber so failing to forfeit his share and all and every of the installments previously paid up. The subscriber to give satisfactory security to the stockholders for due performance of the engagements and contracts on his part, mentioned in the above proposals.

With the velocity expected to be given, the journey between New York and Philadelphia may easily be accomplished in one day.

(Signed) JOHN STEVENS.

The issue of this proposal to form a steamboat company to run in the waters of New York State appears to have met with some opposition, for by the following letter that was published in one of the daily papers of that period, a little more light is let into the conditions surrounding the steamboat question of that day. It shows the writer understood well the question he was discussing. It was what he left unsaid, or the reading between the lines, that had much meaning. It does not appear that any company was organized under charter in the State of New Jersey.

The letter referred to above says:—

"Having seen some propositions of Mr. Stevens relative to the building of a steamboat, I wish, before I venture my money, to have candid answers to the following questions:

"1st. Has Mr. Stevens a patent for a steamboat from the United States or from this State?

"2d. If he has not, and no patent exists, cannot any other person build a boat or boats? If they can, what is to prevent them dividing the profits with him?

"3d. Is there not at present a boat building to carry passengers to and from New Brunswick? And is not the number of persons which Mr. Stevens states as going to New Brunswick daily, extremely exaggerated?

"4th. If Mr. Stevens already has a boat capable of going five miles an hour, why does he solicit subscriptions? And why is she not earning at this moment, when she has no competitor, the large profits he speaks of?

"5th. Have we any other evidence of Mr. Stevens' ability to construct a suitable boat than the voyage from Amboy? And did not a south-west wind blow on the day he specified with sufficient violence to have brought up an oyster boat in the same time under bare poles?

— "6th. Cannot a steamboat of the size he mentions be built for \$20,000? And if it can, why should the public give him \$75,000, if he has no exclusive privilege?

"7th. Are not the persons who subscribe to Mr. Stevens' object, besides the risk of losing their money by its failure, to be personally liable to the penalty of the patent law, if they infringe the rights of any person having a patent from the United States?

"8th. What security will the subscribers have that their money will be refunded if Mr. Stevens' project fails? Will they individually think it worth their while to foreclose a mortgage for 75 dollars, and is not the whole a scheme to borrow money, or to get rid of a hopeless project?

"9th. Has not a grant from this State been already given to certain individuals to navigate its waters with vessels moved by steam engines? Have they not already, and are they not now making every exertion to render this mode of conveyance as generally useful and extensive as possible? And does it comport with that sense of propriety which every just and liberal man ought to respect, to intrude upon their rights by encouraging interlopers who copy their inventions?"

After this first experimental stage has been passed there is no trace of any activity in service with the vessel for some time, but it is altogether probable that she was the subject of many changes during several months of the interval, as we find on April 29th and 30th, 1809, there was another trial made with the vessel, of which the following gives a fair idea of the vessel's speed:

Passed Paulus Hook, from Hoboken.....	10 minutes after 11		
“ Elizabethtown, Old Point.....	1	“	“ 2
“ South Amboy	10	“	“ 6
Arrived at New Brunswick.....	42	“	“ 8

Returned next day:

Leaving New Brunswick, a. m.....	25 minutes after 9		
Passed South Amboy.....	24	“	“ 11
Left Perth Amboy.....	45	“	“ 12
Passed Elizabethtown, Old Point.....	20	“	“ 4
Arrived at New York.....	7	“	“ 8

Passage to New Brunswick performed in 9 hours 32 minutes.

Passage from New Brunswick to New York performed in 9 hours 20 minutes, exclusive of stop at Perth Amboy.

* Distance from New Brunswick to New York, 45 miles.

X This voyage was probably taken to ascertain what time she could make between New York and New Brunswick, for we find on May 4th, 1809, she is advertised as the “*New Brunswick Steamboat*,” to run on that route. She run there only to about June 5th, and, it is believed, not very regularly at that.

This vessel remained at New York until June 8th, 1809, when she was cleared for Philadelphia, Pa., as the “*Phenix*,” with Moses Rogers as Captain, and arrived at the latter port on June 17th for service on the Delaware river. The Marine News of June 8th, 1809, at New York, says: “We understand the steamboat “*Phenix*” starts to-day for Philadelphia.” All

* Distance from Battery at New York City to Perth Amboy, 23 miles (statute).

Distance from Battery at New York City to New Brunswick, 37 miles.

the early authorities had said it was June, 1808. They encountered a severe thunder storm while off the coast, and that was probably the reason for taking refuge in one of the harbors on the coast to make repairs, which accounts for the long time on the way. The story of a severe gale and a schooner accompanying her on the way is open to doubt. The record at the New York Custom House fails to show any schooner leaving New York for Philadelphia for several days prior to June 8th. Robert L. Stevens, who in later years became one of our foremost marine engineers, accompanied the vessel on the outside trip. The vessel was in all probability lengthened after the first season on the Delaware river, and had originally an engine with two 16-inch cylinders, but after a service at Philadelphia this engine was removed and another substituted when lengthened. Her first trip on the Delaware river was on July 5th, 1809, to Trenton, "from Becklies wharf at 8 o'clock to-morrow morning." She made about ten trips in all during the summer, with vacations for repairs that became frequent, and in the fall was laid up for a change in the motive power, etc.

At this time the "Phenix" is referred to by a Philadelphia paper. After naming the "Clermont" and the "Rariton," the latter as the better of the two, it says of the "Phenix":

"After travelling in these boats, that in the Delaware is seen to great disadvantage. The power which moves her is too weak to produce adequate speed, as it is questionable whether she will at any time exceed 5 or 6 miles an hour, and against wind and tide not perhaps more than two miles an hour. It was hoped the proprietor would have remedied this defect. There is no question that if there was a steamboat calculated to move with equal velocity with the "Rariton" boat, and connected with enterprising and practical men of business on the Delaware, she would prove a fortune to all concerned and a great advantage to the public. This boat need not be more than two-thirds, or at most three-fourths, the size of the "Rariton" boat, as her voyage would always be performed by daylight. No room for births (berths) is necessary. She ought to be constructed for drawing the least water possible to avoid inconveniences from the sand bar near Trenton. If the proprietors of the patent right would

build such a boat at Philadelphia of suitable power and dimensions there can be no doubt but ample capital for the enterprise would readily be produced, and that it would result much to the advantage of all concerned."

There is no reference to this vessel in the discussion on the steamboat monopoly between Colden and Duer. The only place it is further mentioned is in the New York and New Jersey steamboat controversy, in the petition to the legislature of New Jersey of the owners of the "Rariton," where they say: "That your petitioners for the two first years lost a considerable sum of money by the steamboat "Rariton." They tried to sell or charter the vessel, but failed. Your petitioners were, therefore, induced to continue the route under a hope that they would receive some encouragement by a connection with the steamboat "Phenix" in the Delaware, as a steamboat line had been established by John Stevens, Esq., and your petitioners, between the two great cities of Philadelphia and New York. In this they were fortunately not disappointed, as from that period to the present time the "Rariton" has afforded some compensation for the great risk your petitioners have run in making so expensive an experiment."

The history of this vessel would, from all the light on the subject at present, appear to be that John Stevens had no idea in building a side-wheel boat prior to the construction of the "Clermont," for why did he construct a small steam vessel *with side wheels*, as he says, on the first appearance of the North River Steamboat? This was certainly an experimental vessel with side wheels. Then there is so far no record of a larger vessel until the fall of 1808, when John Stevens offers a proposal for the formation of a company to operate a steamboat to New Brunswick. This makes it altogether probable that the "Phenix" was commenced some time during the winter or spring of 1808 and completed in the following fall, when the trip was made as recorded in the proposal. There is every reason to believe the plans for the vessel were not worked out until after the small vessel was found a success. Or could this have been one of his former experimental vessels that had been lengthened? The "Clermont" was lengthened the same winter. She was not called "Phenix"

till just before leaving for Philadelphia. The space that has been given to this vessel is not because of its success as a steam vessel, though it was the first out and out American-built steam vessel, but to present many facts connected with its career that have not been handed down to us. In that regard tradition has been remiss in her duties. There cannot be found any license or enrollment for this vessel either at New York, Philadelphia, or Perth Amboy, N. J.

Livingston and Fulton, holding control of the navigation of the waters of New York State by steam vessels, and after it had been demonstrated that they were successful in propelling a vessel by steam as required by the conditions of the act giving them the exclusive rights, brought more clearly to the minds of the people the monopoly held by them, and doubts were entertained by many whether such a grant was valid.

X In 1810 a company was formed at Albany who put on the river in 1811 two boats, named respectively "Hope" and "Perseverance," in opposition to the Livingston & Fulton line, which brought the matter to a crisis. These boats were originally built to be driven by engines with a "Pendulum" motion, but after a trial on a small scale that project was abandoned and steam engines and boilers, built by Robert McQueen, of New York, were placed on board. Livingston and Fulton now applied for a perpetual injunction against the opposition company and, after the case had been carried through the courts of the State, it was granted. They were subsequently delivered to Fulton and Livingston who broke them up in 1813.X

To further strengthen themselves against any opposition, Fulton applied for another patent, which was granted February 11th, 1811, to be more fully protected regarding the application of paddle wheels and other parts of his steam engine. Also, on April 9th, 1811, an act was passed by the New York legislature for the further protection of the privileges granted to Livingston and Fulton.

By the force of these enactments all opposition to the monopoly was for a time silenced, until Aaron Ogden, Governor of New Jersey, petitioned the legislature of New York to remove the restriction, and that he be allowed to run a

steamboat, which he had constructed, between Elizabethtown in New Jersey and New York City. This steamboat was built by Aaron Ogden in 1811 and named "Sea Horse." It was 75 feet keel and 14 feet beam, and fitted with a lever-beam engine from the designs of Daniel Dod, having the beam and connecting rod of wood. This was the pioneer of the American beam engine. A few more of the same type were built at a later date. This petition was referred to a committee in the Assembly of the legislature who reported March 8th, 1814, "that as Ogden's boat had been duly enrolled for the coasting trade, and as the steamboats of Livingston and Fulton are in substance the invention of John Fitch, patented in 1791 to him, and after the expiration of his patent common to all citizens of the United States, and as Ogden had built his boat upon principles invented by Fitch, which had been improved by Daniel Dod, it was questionable whether a State had the power to pass any law interfering with the power of Congress to regulate commerce between the States"; and the act of 1811 they declared to be unjust, "that it shuts the courts of justice of this State against any person who may be desirous of bringing to a legal test the rights claimed by Livingston and Fulton, as by the provisions of that act the defendant in any suit to be commenced by them must lose his boat and his machinery, even should he eventually gain his cause." The bill, with some changes, was passed by the Assembly, but rejected in the Senate.

Livingston and Fulton now compromised the matter with Ogden by giving him permission to run his steamboat on his ferry route under the privileges held by them for ten years. Thomas Gibbons, of Savannah, Ga., who was a part-owner in the ferry with Ogden, subsequently opened an opposition ferry line to Ogden, and it was on this route that Commodore Cornelius Vanderbilt was captain on the "Bellona." Gibbons, in order to test the validity of the grant of the exclusive privilege by the State of New York, put on two steamboats, the "Stoudinger" and the "Bellona" between Elizabethtown and New York City, adjacent to the ferry run by Ogden under the Livingston & Fulton privilege. Ogden applied to the New York State courts for an injunction, which was granted, prohibiting Gibbons from running his vessels upon the waters of

the State. The case was subsequently carried to the United States Supreme Court, where in 1824 a decree was entered against Ogden, thus breaking down the steamboat monopoly that had existed in New York State for 17 years. The long and costly legal contest ruined Ogden financially.

Fulton in returning from Trenton, N. J., where he had been attending court in the case of Livingston vs. Ogden, contracted a severe cold, from the effects of which he died on Feb. 24, 1815. Robert R. Livingston, who had been associated with Fulton in his steamboat enterprises, died about a year previous.

X In the spring of 1813 there were in service in New York waters, three steamboats running to Albany, one to Amboy, N. J., one to Tappan, and one to Elizabethtown, N. J. The "Fulton" was building at this time for the New Haven route, but was not placed in service until 1815. There were also the ferryboats to Brooklyn and Jersey City. At the same time there were six passenger steamboats and ferryboats at Philadelphia, Pa. X

Fulton's boats were mostly fitted with masts and sails, with a flush main deck, except around engine and boiler, with an awning covering a space for passengers near the stem and stern, which they used in pleasant weather. There were no pilot houses on these vessels, the pilots being exposed to the weather during the performance of their duties.

Up to 1813 all of Fulton's boats were built with flat bottoms, their bows very much like to our canal boats of the present day, the several horizontal sections being similar in mould to each other. It was not until the "Fulton" was built in 1813 that a "dead rise" was given to the floors of a steamboat, and a keel made use of to strengthen the hull, as the boats previous to this date when in motion "worked" so much that their life-time was short compared to those in after years.

After building the "Clermont" Fulton erected a machine shop at Jersey City, near where Secor & Co. built the Monitors for the U. S. Government during 1863, where he built some of the engines for his later boats and made the repairs to the machinery. There was also a railway for repairs to the hulls of the vessels. The iron castings were purchased from Robert McQueen, and also from John Youle, both of New York. The

brass work was furnished by James P. Allaire, who commenced business in 1806, and who in after years established the Allaire Works. These repair shops were removed to the foot of Beach Street, New York City, in the fall of 1811, but they were burned out during the same winter. They were shortly after rebuilt. These works had the only boring mill at that time for boring out large cylinders outside of the one at McQueen's foundry in Duane Street, New York.

The North River Steamboat Company lost a valuable employee when Louis Rhoda, the principal engineer of the Company, was crushed to death in the machinery of the "Nassau" on the Brooklyn ferry on May 10th, 1814. There were but few engineers in this country at that period, as the number of steamboats was small. He was a trusted assistant of Robert Fulton, and had been with him as an engineer in some of the law suits of the Company to protect their legal rights from infringement.

In 1815, after the death of Fulton, James P. Allaire leased the shops, and shortly after obtained the contract for the building of the engine and boiler for the "Chancellor Livingston," which were finished early in the following year. This was the largest steamboat that had been built by the North River Company and cost complete one hundred and twenty thousand dollars. In 1816, James P. Allaire moved all the tools and machinery to his brass foundry in Cherry Street, New York, and it was then and there that he laid the foundation for the largest and finest steam-engine works of its day. It was here that the only planing machine in the country was to be found in 1828, and that was originally built for other than steam-engine work.

All of the steamboats enrolled at the New York Custom House from 1808 to 1820 consist of the following vessels, viz.:

"North River Steamboat of Clermont," 1808, details on another page.

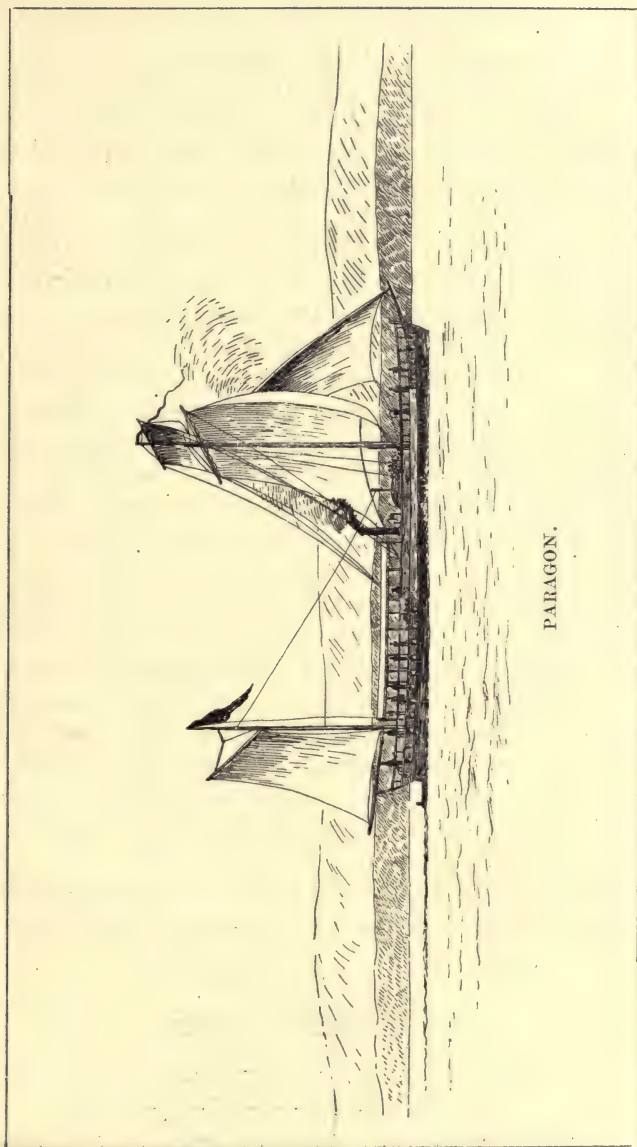
"Car of Neptune," 1808; 175'x24'x8'.

"Paragon," Nov. 9, 1811; 167'x26'10x7'9.

"Fire Fly," Sept., 1812; 81'x14'x4'5.

"Richmond," July 6, 1814; 154'x28'x9'.

"Chancellor Livingston," 157'x33'6x10'3,



built by Henry Eckford and enrolled in the name of Dominick Lynch, Jr., March 29, 1817.

All of the above-named vessels were of the North River Steamboat Company, and the hulls were constructed by Charles Brown, with the exception of the "Chancellor Livingston." "Raritan," 1809, details on another page. "Hope," 1811, built at Albany, N. Y., for James Van Ingen and others; was 149'x20'x7'7". Passed into the possession of the North River Steamboat Company in April, 1813. There was a mate named "Perseverance." "Stoudinger," 1816, built by Tunis Bergh for James P. Allaire for an experiment with his system of paddles, but subsequently became Cornelius Vanderbilt's "Mouse in the Mountain"; was 47'x12'x4'10". "Emeline," 1818, built by David Brown for John Fowler and Frederick Baits of New York; was 47'x15'x5'. "Manhattan," Nov. 2, 1819, built by Noah Brown at New York for the New Orleans & Louisville Steamboat Company, consisting of Richard Hopkins and Robert McQueen and others of New York; was 144'x31'4"x10'. Was sent to New Orleans, La.

The first steamboat excursion appears to have been at an early date. The "Fulton" was built to run on the New York & New Haven route, but when completed the war with Great Britain was on in earnest and it was thought to be unwise to open the line as the British naval vessels were very active in the east end of Long Island Sound at that time. Before going on the Albany route, on May 25, 1814, she was sent on an excursion to Sandy Hook, N. J., where there were 50 passengers carried, who were each charged \$3.00 for the pleasure of the sail to the Atlantic ocean.

The "Phenix," on Lake Champlain, N. Y., commenced running from Whitehall in Sept., 1815, under Fulton's privilege.

U. S. SUPREME COURT.

February, 1824.

Gibbons vs. Ogden.

Decree.—This cause came on to be heard on the transcript of the record of the court for the trial of impeachments and corrections of errors of the State of New York, and was argued

by counsel. On consideration whereof, this court is of opinion that the several licenses to the steamboats, "The Stoudinger," and "The Bellona," to carry on the coasting trade, which are set up by the appellant, Thomas Gibbons, in answer to the bill of the respondent, Aaron Ogden, filed in the court of chancery for the State of New York, which were granted under an act of Congress, passed in pursuance of the constitution of the United States, gave full authority to those vessels to navigate the waters of the United States, by steam or otherwise, for the purpose of carrying on the coasting trade, any law of the State of New York to the contrary notwithstanding, and that so much of the several laws of the State of New York, as prohibits vessels licensed according to the laws of the United States from navigating the waters of the State of New York by means of fire or steam, is repugnant to the said constitution, and void. This court is, therefore, of opinion that the decree of the court of State of New York for the trial of impeachments and the corrections of errors, affirming the decree of the Chancellor of that State, which perpetually enjoins the said Thomas Gibbons, the appellant, from navigating the waters of the State of New York, with the steamboats "The Stoudinger," and "The Bellona" by steam or fire, is erroneous, and ought to be reversed, and the same is hereby reversed, and annulled. And this court doth hereby direct, order, and decree, that the bill of the said Aaron Ogden be dismissed, and the same is hereby dismissed accordingly.



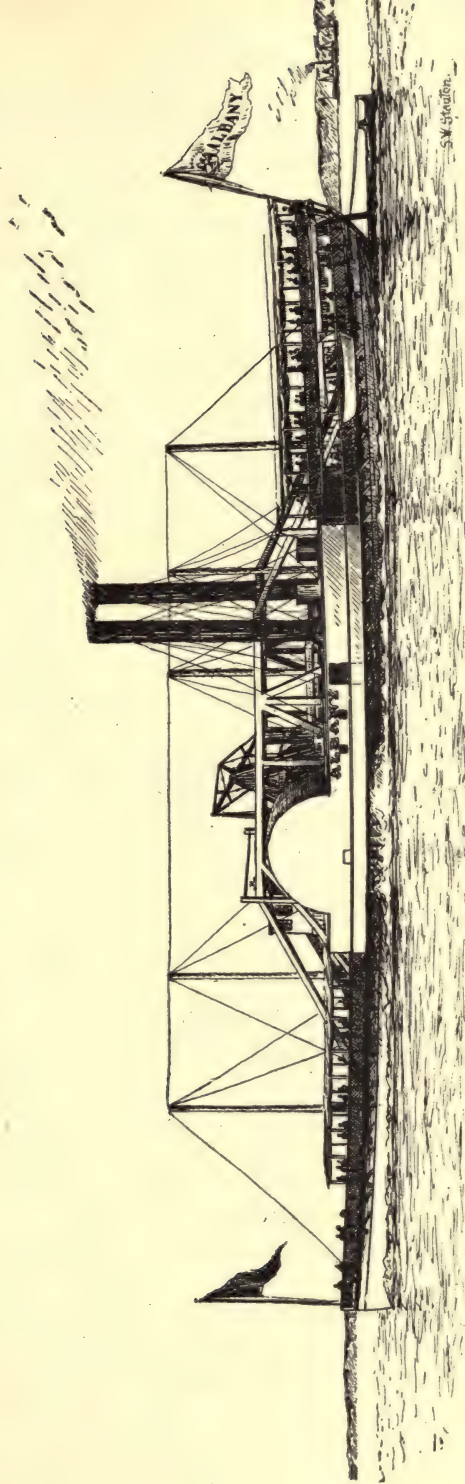
CHAPTER II.

HUDSON RIVER.

NEW YORK TO ALBANY AND TROY.



AFTER the decision of the Supreme Court of the United States in 1824 in the case of Gibbons against Ogden, which removed all barriers to the free navigation of the rivers of the United States by boats propelled "by fire or steam," the number of steamboats increased on the Hudson river both by new vessels that were built for that service as well as those that were brought there from other States. These vessels were great improvements in both passenger accommodations and speed over the vessels that belonged to the North River Company, that had for such a long time the control of the water transportation of the Hudson River. Opposition lines at once sprung up. The old line in 1825 was composed of the "James Kent" 364 tons, "Hudson" 170 tons, "Chief Justice Marshall" 300 tons, and "Saratoga" 250 tons. In the same year the Hudson River line was started with two new boats, the "Constitution" and the "Constellation," to which was added the "Independence" in 1827. In 1828 the "De Witt Clinton" was put on the river by parties in Albany. In 1827 Robert L. Stevens had the "North America," the "Albany," and the "New Philadelphia" on the Albany route. John Stevens and his sons had refused to enter into competition on the river as long as the Fulton line was in active service, but on their withdrawal from business in 1826 the Stevens became very active in passenger transportation on the river and remained so for several years. All of the lines were consolidated in 1832 under the title of the New York, Albany & Troy line, or Hudson River Steamboat Association, to which were added subsequently other and new boats when they run both night and day boats. It might be here stated that the only lighthouses on the river prior to 1840 were Stony Point light, Esopus Meadows light,



"ALBANY."

S.W. Houghton.

Rondout light, Saugerties light, Four-Mile Point light, Stuyvesant light, Coxsackie light.

In 1822 Robert L. Stevens substituted for the heavy solid cast-iron working beam of the marine engine, the "skeleton" beam of iron with a wrought-iron strap. The skeleton beam of the engine in the ferryboat "Hoboken" was not the first skeleton beam, though no doubt the first of iron. There was one made of wood in use on a pumping engine in Holland, having a cylinder of 52 inches diameter that was constructed prior to 1802, and probably the beam of this engine furnished the idea for the skeleton beam of the marine engine.

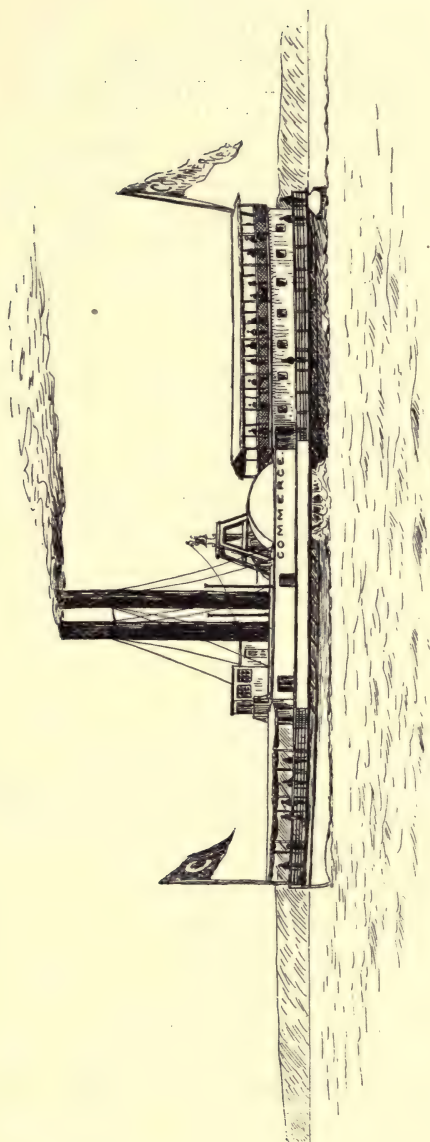
In 1824 James P. Allaire built the first compound engine for the "Henry Eckford," having cylinders of 12 inches and 24 inches diameter by 4 feet stroke, and afterwards several others for the Hudson river, among them being the "Sun," having cylinders of 16 inches and 30 inches diameter by 4 feet stroke, said to have made the trip from New York to Albany in 1826 in 12 hours and 16 minutes. Three of the Swiftsure line of towboats on the river that towed the Safety Barges at this time also had compound engines, of which line William C. Redfield was the chief engineer. Regarding these safety barges, the following copy of an advertisement will show the purpose for which they were brought into use:

"Passengers on board the Safety Barges will not be in the least exposed to any accident by reason of the fire or steam on board the steamboats. The noise of the machinery, the trembling of the boat, the heat from the furnace, boilers, and kitchen, and everything which may be considered unpleasant on board a steamboat are entirely avoided."

These passenger Safety Barges were run in the summer season from 1825 to 1829, and under favorable conditions made eight or nine miles an hour. The increase in the speed and accommodations of steamboats during that period drew the passenger business from these barges, so that they were discontinued after 1829 for want of patronage.

Time of these towboats and barges in 1825 was from 18 to 20 hours.

In 1826 the "New Philadelphia," built at Philadelphia, Pa., and belonging to Robt. L. Stevens, was placed on the New York and Albany route. This vessel and her machinery was



"COMMERCE," HAVING COMPOUND ENGINE.

the subject of many changes and experiments. It was after running a few trips that a false bow was added to the vessel to give her water lines an easier entrance. This addition was built up from the keel and about two feet above the surface of the water, decked over and caulked, and carried back far enough on the hull of the vessel to make it secure. The vessel had no less than six false stems at different periods. It is said that Mr. Stevens applied to Bell & Brown, who were among New York's best shipbuilders, to place the false bow on the vessel, but they refused, as they said it would be a subject of ridicule, and they did not desire to do what seemed to them an unsightly piece of work. The work was done at the Hoboken yards.

False bows were also placed on the "North America," the "Albany," the "Trenton," the "Novelty," and the "Constitution" at a later date.

The "New Philadelphia" had an experimental trip from New York to Albany on August 24th, 1826, time 12 hours and 23 minutes, being the shortest time on record at that time between those points. A daily paper of New York City has the following advertisement on August 26th, 1826:

"The low-pressure steamboat "New Philadelphia" will commence her regular trips to and from Albany on Tuesday, the 29th. She will leave the dock foot of Courtland street, formerly occupied by the North River Co., on Tuesdays, Thursdays and Saturdays, and Albany on Mondays, Wednesdays and Fridays. She will land and receive passengers at the usual landings. The "New Philadelphia" was constructed by R. L. Stevens. She has a low-pressure engine, and her boilers are not on board the boat, but are so placed over the water on her guards, which project from her sides, as to render it almost impossible that any passengers should receive injury from an accident to the boiler. From the strength of the boat and the construction of her machinery there is little or no jar in any part of the vessel. Her cabins are light, airy, and spacious—elegantly fitted up with mahogany, maple and marble. Her dining-room is 44x22 feet, and decorated with a variety of paintings.

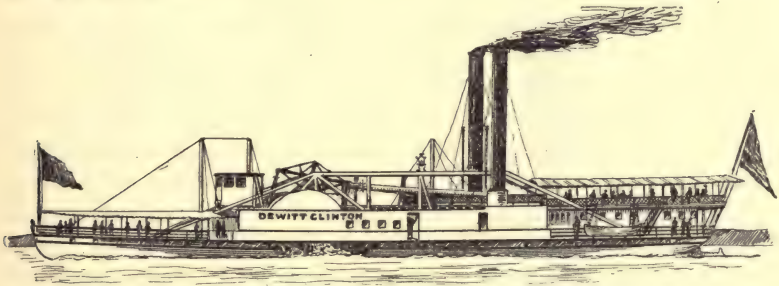
"It is expected from the trip lately made that her passages, from a difference in wind and tides, may vary from 10

to 14 hours, so that at this season of the year passengers may calculate on being landed at Albany before dark!"

The engine of this vessel also had balanced poppet valves, and wrought-iron side pipes about 30 inches diameter, fitted to her engine at a very early date. These latter were used for several years.

Prof. Renwick, in his treatise on the Steam Engine, says: "In a passage made by the author on the Hudson, in 1829, the wheels of the "New Philadelphia" averaged $25\frac{1}{2}$ revolutions per minute, and the piston moved with a velocity of 405 feet per minute, being 21 feet more than on the "North America."

The North America was built by R. L. Stevens in 1827, with a pair of beam engines, and as she was a light-built vessel he put in her a frame or truss for stiffening the hull. This was the first framing of the kind for a similar purpose that had been made use of. The vessel had a "spoon bow," and her water lines were hard. The average number of revolutions of her engines were about 24 per minute, and steam pressure from 9 to 12 inches.



"DEWITT CLINTON."

✕ In 1830 the piers in New York City of the several North River lines were:

North River line, foot of Barclay Street.

Hudson River line, foot of Courtland Street.

Newburg line, foot of Albany Street.

Tarrytown, Sing Sing, and Peekskill, foot of Warren and Murray Streets.

Safety barges for Albany, Battery Place.

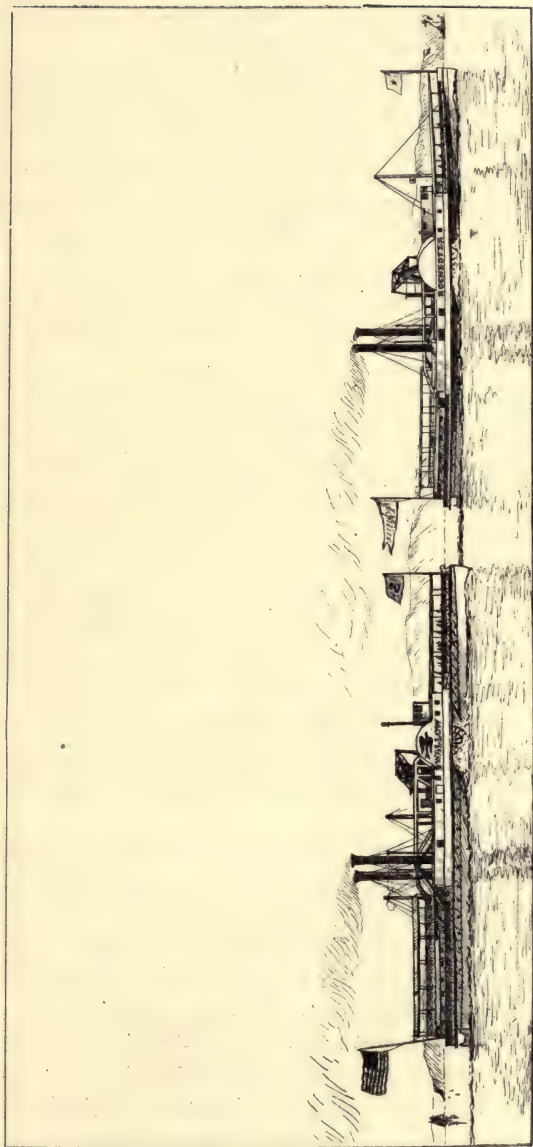
The "DeWitt Clinton" in April, 1831, left Albany at 4 minutes past 4 in the afternoon, and arrived at the foot of

Barclay Street, New York, 12 minutes before 3 next morning, making the trip, including landings, in 10 hours and 44 minutes; Albany to Hudson, 1 hour and 54 minutes; Hudson to Catskill, 0 hours 22 minutes; Catskill to Rhinebeck, 1 hour 38 minutes; Rhinebeck to Poughkeepsie, 1 hour 10 minutes; Poughkeepsie to Newburg, 1 hour 0 minutes; Newburg to New York, 4 hours and 20 minutes.

In 1830, Dr. Eliphalet Nott, then President of Union College at Schenectady, N. Y., and inventor of the anthracite coal-burning stove for domestic use, had built at Hyde Park on the Hudson River, by Chauncey Goodrich, the hull of a steam-boat 175 feet long which, when completed, was named the "Novelty." The engines of this boat were built at "Burnt Mill Point" on the East River near the foot of Fourteenth street, New York City, and it was from the building of these engines that the Novelty Works, which in after years become so famous as a marine engine works, received their name. Dr. Nott had associated with him Nezhiah Bliss, who had seen considerable service in building and commanding steam vessels on our western rivers. This vessel was fitted with a pair of high-pressure engines,* one on each guard, with cylinders 30 inches in diameter and 6 feet stroke, with single poppet valves operated by levers, connected to the separate water wheel shafts. Steam was furnished by four sets, of three each, tubular boilers of 40 inches diameter each, that are credited with being the first for marine purposes that were of any success. This vessel made a few trips to Albany with fair time to her credit, but her career appears to have been short-lived, as originally built. Her motive power was the subject of many experiments.

In the "Mechanics' Magazine" of 1835 is a letter to the editor saying: "Being in New York a few days since and hearing of a large establishment called the Novelty Works, said to be owned by Dr. Nott and others, I procured from a friend a note of introduction to a gentleman who was one of the partners and visited the place. . . . I found an immense

*It is given to me upon good authority that the "Novelty" at first had a single high-pressure engine built at Pittsburg, Pa., but this was removed shortly after her completion, and the pair built at New York substituted.



"SWALLOW" AND "ROCHESTER" RACING.

establishment, in which were carried on all the different branches and operations in any way connected with making stoves, steam engines, boilers, and almost every other article of large machinery, and even steamboats."

X In June, 1835, Daniel Drew, A. P. St. John, and others, started an opposition as the "People's line," with the "Westchester," a small boat of 134'x23'x8', and the "Emerald," a little larger, of 156'x23'x8', to Albany, as day boats with landings, the passenger accommodations of each vessel being for not over 150 passengers. X This enterprise may be said to have been the nucleus of the present People's line.

Daniel Drew's first interest in steamboats is believed to have been in the "Water Witch," in 1832, then a new boat running to Hartford, Conn.

There were during the period between 1830 and 1840 several steamboats built for service in the waters adjacent to New York, but none commanded so much attention as the "Rochester" and the "Swallow," built in 1836.

The "Rochester" was built for the opposition company, and the "Swallow" for Anthony N. Hoffman of New York City, and others, who ran her in the interests of the North River line. This was the first lively and determined opposition that had been met on the Albany route, and what made it more so was the equal, or nearly so, speed of the two boats. They have been known when racing to have made over 28 revolutions of their wheels per minute, with 40 lbs. and over of steam, while their average pressure was about 20 lbs. and 24 revolutions.

This opposition was kept up for about five years, with racing at frequent intervals, and during all this time they were the acknowledged fast boats of the river. The best time made between New York and Albany, by either one of these boats, was about nine hours. The "Swallow" had single poppet valves and the "Rochester" double poppet valves.

These two boats were each subjected to changes and alterations after running a year. The "Swallow" was lengthened 24 feet; when first built was considered an inferior vessel as regards speed; had a 46-inch cylinder replaced by a 52-inch cylinder, and her water-wheels increased in diameter. The "Rochester" had her power increased by the substitution of a

50-inch cylinder for a 43-inch, which was the size of her original cylinder. Both of these boats had return flue boilers of iron, and burned about 18 to 20 cords of wood on an average each trip, but when racing together, which was quite often, and taking the season through there was very little choice between them, they would burn 23 to 25 cords per trip. The engines of both of these boats were built at the West Point Foundry, at that time located at the foot of Beach Street, New York City, but was removed to Cold Spring on the Hudson River in 1839.

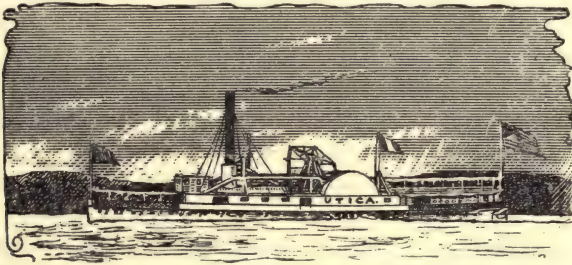
Matters had got to such a state between these two steamboats, after running nearly one season, that the suspense could no longer be endured by those interested, so a match was at last agreed on to test their relative speeds. It was decided that they should both make the trial without either one carrying any passengers, only those who were necessary to the working of the vessels and their machinery being permitted to accompany them. They started from near Jersey City ferry at 4 p. m., on the afternoon of Nov. 8, 1836, each prepared to do their best. They steamed up the river within sight of one another all the time, the "Swallow" having the advantage. All had worked smoothly and without a mishap during all the driving and straining to keep at the head of the procession until they were just below Hudson, when the engine of the "Swallow" became partially disabled that made it necessary to slacken her speed for a few minutes, when she was put under full headway again, and they arrived at Van Wies Point, which is 140 miles from New York, the "Rochester" in 8 hours and 57 minutes, and the "Swallow" in 9 hours and 2 minutes, the "Rochester" winning by 5 minutes. When the "Swallow" was "slowed up" she was 4 minutes or about a mile ahead. The tide for the greater part of the distance was against the boats. This was a very close termination of the race, and if the "Swallow" had not been compelled to slow down, it was the opinion on both boats that the end would have been a close finish; but accidents will happen to steamboats as well as to other means of conveyance. This race did not settle the question, for they were often afterwards engaged in trials of speed while on their trips, with the "Swallow" as often as the "Rochester" the victor.

A short time after building the "Rochester," the same company bought the "Utica," that was then building for other parties, and added as consort to the "Rochester." She was a smaller boat and no match for the racers.

David Stevenson, an English engineer, in his work on "Engineering in North America," written in 1838, gives a very interesting account of a trip he made in 1837 on the "Rochester" from Albany to New York, in which he says:

"The Rochester" and the "Swallow" were said to be the two fastest boats running on the Hudson in 1837. I made a trip from Albany to New York in the "Rochester," on the 14th of June, on which occasion, with a view to test the vessel's speed, I carefully noted the time of departure from Albany, the times of touching at the several towns and landing places on the river, with the reputed distance between them, the number of minutes lost at each place, and the hour of her arrival at New York. Thirteen stoppages, which I found to average three minutes each, were made to land and take on passengers. The "Rochester" performed the voyage in 10 hours and 40 minutes. From this 39 minutes must be deducted for the time lost in making the 13 stoppages, which leaves 10 hours and 1 minute as the time during which the vessel was actually occupied in running from Albany to New York. Assuming the distance between those places to be 150 miles, the average speed of the vessel throughout the trip was 14.97 miles per hour, but even if we assume the distance to be only 145 miles, which there is every reason to believe is too small, the average rate is still 14.47 miles per hour. The current was in the "Rochester's" favor during the first part of the voyage, but the Overslaugh Shoals, and the contracted and narrow state of the navigable channel of the river for about 30 miles below Albany, checked her progress, and consequently for the first 27 miles her speed was only 12.36 miles per hour. This was her average rate of sailing during the part of her course when her speed was the lowest. After the first 30 miles the river expanded, affording a better navigable channel, when her speed gradually increased, and before the flowing tide checked her progress the vessel attained the maximum velocity indicated by my observations, which between two of the stopping places was 16.55 miles per hour. When going at

this speed it is possible that she was influenced by some slight degree of current in her favor, although it was quite imperceptible to the eye, as the flow of the tide appeared to produce a stagnation of the water in the river. At West Point we encountered the flood tide, as was very distinctly proved by the swinging of the vessels which lay at anchor in the river. After this we had an adverse current all the way to New York, a distance of about 50 miles, and the vessel's speed during this part of the voyage averaged 14.22 miles an hour. About



"UTICA."

one-half of the voyage was thus performed with a favorable current, and the other half was performed under unfavorable circumstances, owing partly to the shallowness of the water, and the narrowness of the channel in the upper part of the river, and partly to an adverse tide in the lower part of it.

"When the "Rochester" is pitted against another vessel, and going at her full speed, her piston makes 27 double strokes per minute. On the voyage above alluded to, however, the piston, on an average, made about 25 double strokes per minute, so that the speed of 14.97 miles per hour, which she attained on that occasion, cannot be taken as her greatest ordinary rate of sailing. During the time, however, at which her speed was 16.55 miles per hour her piston was making 27 double strokes per minute, and at that time the vessel could not be far from having attained the maximum speed at which her engines are capable of propelling her through the water. . . . The pressure of steam in the boiler is 45 lbs. on the square inch, and the engine works expansively and cuts off the steam at half stroke. The diameter of the "Rochester's"

piston is 43 inches, the length of the stroke is 10 feet and when going at full speed, the piston makes 27 double strokes, or in other words, moves through the space of 540 feet per minute."

Stevenson also remarks, respecting the speed of American steamboats at this period:

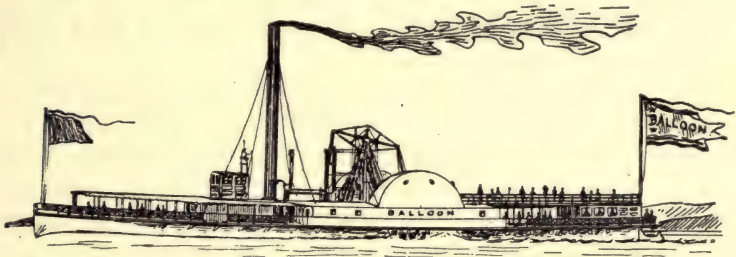
"The speed of the American steamboats has excited considerable wonder in this country, and some people have been inclined to doubt the accuracy of the statements that have frequently been made regarding the extraordinary feats performed by them: fast sailing is a property which is not possessed by all American steamboats, but that a few of those navigating the Hudson River and Long Island Sound perform their voyages safely and regularly at a speed which far surpasses that of any European steamer hitherto built, every impartial person who has had an opportunity of seeing the performance of the vessels in both countries must be ready to admit."

In 1839 Robert L. Stevens sold the "North America" to Isaac Newton and others, who run her in connection with the "DeWitt Clinton," until the latter part of the season. While on one of her trips from New York to Albany and when but a short distance below the latter city, she encountered a field of heavy ice which cut through her planking, and she sank.

A German traveling in this country about this time says regarding a trip on the Hudson River: "I took a passage in the steamboat "North America" on the 23d of November, 1838, from New York to Albany. As the river was already nearly half frozen over a great deal of floating ice was coming down. The boat left New York at 5 o'clock in the evening and arrived at Albany the following morning at 7 o'clock. We made, therefore, including all stoppages, over 10 miles per hour up stream. The length of the vessel is 200 feet, greatest width 26 feet: she has two decks, the lower of which where the engines are is about three feet above the level of the water. She has two separate cabins, the gentlemen's cabin which is at the same time the dining-room, and the ladies' cabin. There were 320 passengers on board, each of whom slept in a berth, and as sufficient room appeared still to remain, one may imagine how colossal this floating palace must be. Two steam engines, with 44-inch cylinders, move the paddle-wheels of 22

feet in diameter. The pressure of steam of this, as of most of the steamboats upon the eastern waters, is about 15 pounds per square inch, and the stroke 8 to 10 feet. The steam is generally cut off at one-third or one-half of the stroke and operates by expansion. For a voyage of 145 miles 25 to 30 cords of wood, (of 128 cubic feet) of soft wood are required. The "North America" draws when loaded six feet. X Upon the Hudson River the passenger fare is, in the most elegant boats, three dollars for the distance of 145 miles between New York and Albany, which gives two cents per passenger per mile. For meals an extra charge is made. In less elegant steamboats passengers are carried the same distance for one dollar, and at this moment even for fifty cents, which gives only one-third of a cent per mile." X

In 1839 the "Diamond" was built at New York for the Albany route, where she run on the opposition to the People's line, until taken into the Associated lines. In the same year the "Balloon" was built by Devine Burtis, of Brooklyn. This



"BALLOON."

steamboat also run on the Albany route for a few years; but was a few years on the New York and Newark route, when she was sent to the Delaware River where it is believed she run until worn out. Her engine was built by James Cunningham, of New York City, and it is probable this engine was the first built with the long stroke of 14 feet, of the Beam-engine type.

Isaac Newton and others in 1840 had built for them by Devine Burtis the "North America," and in the next year by the same builder the "South America," both for the Albany and New York route. The engines of both these vessels were

constructed by James Cunningham, who was a part owner in the "North America." The "South America" was about 30 feet longer than the "North America," but a few inches more beam and with considerable more power in the engine. She was a very narrow and crank boat, as were many of those built for speed at that period, and made a few trips during her career that placed her in the front ranks. The "North America" was the first steamboat that used blowers for an artificial blast in the furnaces of the boilers, driven by independent engines. These two boats continued on the day line for a few seasons, after which they were used as night boats and subsequently for the New York and Hudson route and finally broken up about 1863.

To show the extent to which the rivalry and opposition of the different lines was carried at this period, although no more bitter and heated than previous or later oppositions, it is certainly reassuring to look back at the affair that occurred in June, 1840, and know that such practices are not possible at this period. This was not the first nor the last. Their environment at this early period was much different from what it is at the present day.

The "Napoleon" was a small and very indifferently fitted-up boat, that had been placed on the Albany route as an opposition boat to the Old Line. Her pier was further down town than that occupied by the Associated Lines. On the morning in question, while on her way up the river and when nearly opposite the slip occupied by the "DeWitt Clinton," the latter started out and struck the "Napoleon" just forward of the wheel, careening the latter vessel so that her guard was under the water. The pilot of the "Napoleon" fired several shots from a pistol at the pilot of the "DeWitt Clinton," but fortunately, without any personal injury being done. It was claimed that the latter vessel lay at her dock working her engine full stroke, and when the "Napoleon" was but a short distance from the lower side of the slip the hawsers were cut with a sharp axe and she started out under a full head of steam. Such acts would not be tolerated in these days, for the officers of the vessel committing such an act would have their licenses cancelled by the steamboat inspectors of the district, to say the least.

These contests of opposition lines involved more than the reputations of the speed of the vessels. The way passengers formed a large percentage of the travel on the river, and as they were in the habit of taking the first boat that arrived at the landing and going in the desired direction, it thus happened that those vessels that were frequently second at the landings were sure to be a losing enterprise for their owners: and even some of comparatively fair speed, but not backed by ample capital, were withdrawn in a sharp competition by the low rates of fare that often prevailed.

To show the intense feeling existing just prior to the "Napoleon" vs. "DeWitt Clinton" affair and the effort made to maintain an opposition, the following advertisements speak for themselves:

" TO THE PUBLIC.

"It is the first time in my life that I have been forced to appeal directly to the public; but after having been persecuted as I have been for the last three days by one of the greatest monopolies in this country, my duty towards my family, as I owe them a support, makes it necessary that I should inform the public of my situation.

"I purchased the steamboat "Napoleon" last winter and associated myself with E. C. Corwin and James Cochrane, who became equal partners with me in the boat, and the articles of co-partnership were drawn in such a manner that the boat was to run to Albany and nowhere else. Recently the monopoly, after ascertaining that I was determined not to remove the boat from this route has made extravagant offers, made in such a way that I was to be left alone, and consequently, as my means are small must, without doubt, be ruined and my family beggared. I now solemnly appeal to my friends to assist me in supporting the "Napoleon," for as long as she loses no money they cannot prevent me from running; but if she does, an injunction will be immediately served on the boat.

"I can also state that E. C. Corwin has spurned all their offers, even at the sacrifice of six thousand dollars.

"J. W. HANCOX."

Then a few days after we have another:

“MONOPOLIES AND PERSECUTION.”

“Are the people aware of the disgraceful manner in which the Hudson River monopoly and the towboat monopolies persecute the steamboat “Napoleon,” and her owners especially, by hiring the most abandoned and profligate wretches to run against her for passengers, and making use of the most disgraceful language to prevent passengers from going on board of her.

“They are guilty of the foulest lies and assertions, for they, on the 20th of May, asserted that the Old line, that is, the two monopolies, had bought the “Napoleon”; that is to say, she had become a Judas and betrayed the people.

“We solemnly declare that it is false, and that no such crusaders can ever by their power, threats or money induce us to abandon our honest and honorable pursuits in which we are engaged.

“We had been bred, we thought, on the free waters of the United States, but if this is the manner in which the people are to be driven from their lawful and honorable pursuits, away then with our boasted freedom and let us sink back into monarchy.

“Are the people aware of the manner in which we have been driven from pillar to post for the last few days? When they found they could not traitorize but one of the owners of this boat, they said, “let’s crush them, they are poor and cannot stand against such monopolies as we are but a few days longer.

“Will the people suffer this, or will they patronize the “Napoleon” and keep the fare at \$1.00 and thus sustain the poor in fair, honest and honorable pursuits?

“NAPOLEON.”

“Monopolies and Persecution” is certainly a very odd business advertisement as viewed from that standpoint at this day. As an exhibition of class against class, it should receive first prize, but probably the writer was “talking through his hat.”

In 1840 an Association was formed between the owners of the larger and better equipped boats, principally those running to Albany. Among those in this Association were Daniel

Drew, Isaac Newton, A. N. Hoffman and William Kemble, and the owners of the "DeWitt Clinton," to which the title of the "People's Line" was given and that has been retained by their successors to the present day. An incorporated company followed at a later date.

X The principal steamboat owners on the Hudson River and on Long Island Sound at this time were as follows, viz.:

NORTH RIVER LINE.

Steamboats—"Albany," "DeWitt Clinton," "Swallow," "Champlain," "John Mason," "Columbus," "Union," "General Jackson," "Robt. L. Stevens," "J. C. Heartt," "Utica," "Rochester," and "Saratoga."

Anthony N. Hoffman, James A. Stevens, Robert Dunlop, J. C. Heartt, R. P. Hart, Daniel Drew, Isaac Newton.

SWIFTSURE LINE.

Steamboats—"Swiftsure," "Commerce," "Constitution," "Illinois," "Sandusky," "Oliver Ellsworth," "United States," "Henry Eckford," "New London," "James Fairlie," John Jay," with 54 freighting vessels.

W. C. Redfield, A. Van Santvoord, Isaac Newton, Henry Green & Co., Pope Catlin, Horace Stocking, Joy & Monteith, and Chas. S. Olmstead.

NEWBURGH LINES, ETC.

David Crawford, "Washington"; Benj. Carpenter, "Jas. Madison"; Thos. Powell, "Highlander"; Jas. Cunningham, "North America," "Huntress," and "Thorne."

NEW HAVEN AND HARTFORD LINES.

Steamboats—"Splendid," "New York," "Bunker Hill," "Charter Oak."

Mem. Sanford, Chas. H. Northam, S. B. Stone.

BOSTON TRANSPORTATION CO.

Steamboats—"Massachusetts," "Narragansett," "Rhode Island," "Providence," and "Mohegan."

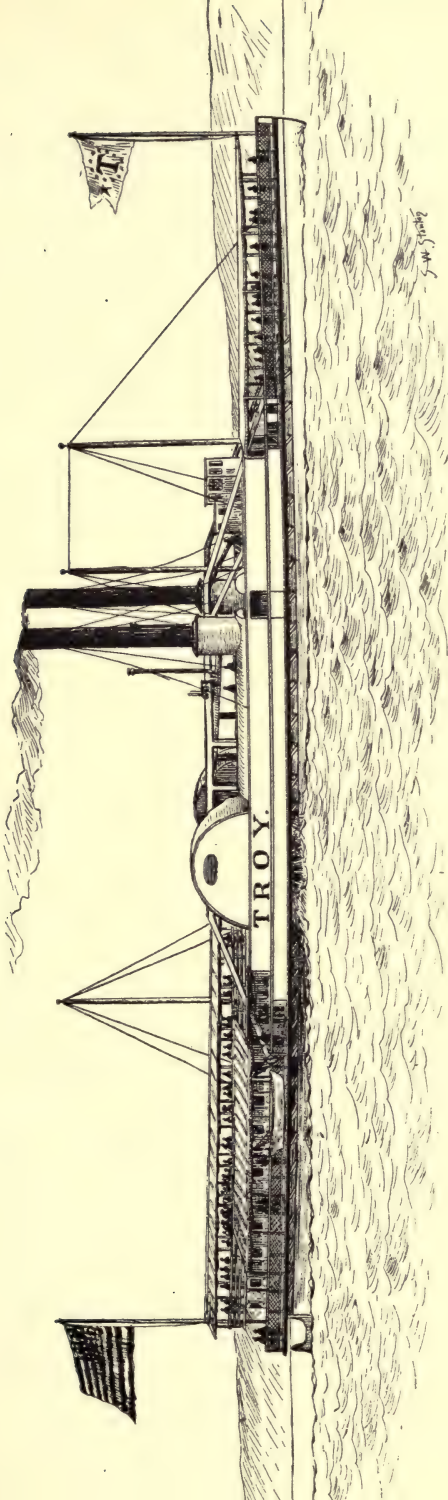
Thaddeus Phelps, Nevins & Townsend, R. S. Williams, James G. King, C. H. Russell, and William Comstock. X

1841.

People's Line at 6 P. M.	People's and Old Line (U. S. Mail Line) 5 P. M.	Old Line Day Boats 7 A. M.	Opposition at 5 P. M.	Opposition at 6 P. M.
South America	Swallow	Troy	Napoleon	Diamond
North America	Utica	Albany		
Rochester	DeWitt Clinton			

This year was a lively one for opposition, the "Diamond" running most all of the season, while the "Napoleon" was on the route but a few months. On the night of the 24th of April, as the "South America" was on her trip up the river, when above Poughkeepsie and going along at a good rate of speed, with the "Diamond" bringing up the rear at a respectful distance, her shaft broke, followed by the breaking of the connecting rod, which, leaving the opposite end of the working beam without any weight to sustain it, allowed the piston to fall with its rod and connections, thus breaking the steam cylinder and cover, and making a general wreck of the principal parts of the engine. The escaping steam from the broken steam-pipe scalded some of the passengers by its inhalation. The opposition boat came up and took off her passengers and landed them in Albany.

In October of this year the "Rainbow," owned by Robert L. Stevens, and built by him for speed, made a few trips to Albany in this month on the day line. She was an experimental vessel of very narrow beam, compared to her length, which was as 1 to 14. Her power was a pair of inclined condensing engines, placed in the hold, one forward and one aft of the water-wheel shaft, with cylinders of 36 inches diameter by 10 feet stroke, and connected to one crank pin. Her boilers, which were in the hold also, were strapped with bar iron 6 inches by $1\frac{1}{4}$ inches every 10 inches apart for strength; the pressure of steam carried being from 80 to 100 pounds per square inch. The water-wheels were 24 feet in diameter by 7 feet face, and the water-wheel shaft was of boiler iron 3-8 of an inch thick, 36 inches diameter with cast-iron ends. She had very high wheel-houses, and taken all in all, was not what would be called a handsome boat in appearance. Upon trial, she failed to meet the expectations of her owner, not being able to make any better time than those called 10-hour boats,



"TROY."

or of fair speed. She was a few years after put to towing in New York harbor, but was afterwards sent to Philadelphia, Pa., where she continued in the same service on the Delaware River, where she was worn out.

A story* is told of this boat while on the Hudson River, that on one of her trips up the river she run into some vessel and knocked off part of her stem, and when she arrived in Albany, in order to repair the damage received, they procured a few barrel staves, with which to make repairs to the damaged stem, that was exceedingly fine and sharp.

Robert L. Stevens did probably more than any other person toward the early development of American river steamboats. Being possessed of abundant means and having a mechanical turn of mind, he was enabled to make experiments in Naval Architecture and Marine Engineering, that those not so fortunate in this world's goods were unable to put in practice. He had quite large works of his own at Hoboken, N. J., where he employed some of the most skilled mechanics, and where a large amount of the work on the hulls and engines of his vessels were executed. For a number of his experiments, part of the work was done at his own works and pieces were made at different marine-engine works in New York and vicinity, but in such manner that the whole could not be known to any person outside of those in his confidence. All his experiments were carried on, so far as it was possible to do so, without its being known to the mechanical profession at the time, and there is no doubt but a number of experiments were made on the steamers in which he was interested (for the Stevens family was largely interested in the Camden and Amboy Railroad Company, who run a line of steamboats from New York to Amboy to connect with the railroad) or owned, and which did not turn out a success, and of which no public record has been left. To him must be given the credit of very valuable improvements in the hull and engines of our American river steamboats, several of which are in use at this date. In later years, Francis B. Stevens, a nephew of Robert L. Stevens, and who was with him in several of his later experiments, also de-

* By the first assistant engineer at the time, to the writer.

veloped mechanical talent, and was the inventor of several improvements in the American Beam engine.

The "Swallow" was chartered this year by the Associated Lines, for the purpose of supplying the place of any of the boats of these lines which were compelled to withdraw during the season on account of repairs.

1842.

People's Line at 6 P. M.	People's Line and Old Line (U. S. Mail Line) 5 P. M.	Old Line Day Boats 7 A. M.	Opposition 5 P. M.	Opposition 6 P. M.
Rochester	Swallow	Troy	Washington	DeWitt
So. America	No. America	Albany	Napoleon	Clinton
	Columbia		Wave	
			Curtis Peck	

When the season of navigation opened this year on February 7th, the Associated (or People's) lines charged \$3.00 fare for passengers; this lasted but a few weeks, when the rate was lowered to \$1.00. About the middle of April the "DeWitt Clinton" was placed on the route by the Associated Lines as an opposition to their regular line, with the prevailing rate of fare, but during the latter part of the month the "Washington" entered as a further opposition, and lowered the fare to 50 cents (or 4 sh.) per passage during most of the time while on the route, which lasted until September. The "DeWitt Clinton" maintained the fare at \$1.00 during the time of her running, which ceased in July, after which the Associated Lines raised the fare to \$1.50 (or 12 sh.), and the "Washington" for a time to \$1.00. In July the "Napoleon" also entered for a share of the travel, and lowered the fare to 25 cents (or 2 sh.); but this low rate does not seem to have been inviting to the traveling public to a profitable extent, for the season lasted but one week. The "Wave" came on in place of the "Washington" in September with the low fare of 50 cents, which lasted but a few weeks. The "Curtis Peck" was an opposition boat in October with the fare at \$1.00, which the Associated Lines met by cutting to the same rate every alternate night, but when the opposition boat was on the other end of the route the regular rate of \$1.50 was charged, which lasted but a few weeks. This boat belonged to Elijah Peck, of Flush-

ing, N. Y. The "Columbia" was a new boat, built during the previous year, and was a very good boat for the route, although not of high speed. She was taken into the Associated Lines during the year. The "Rainbow" made one trip on the day line this year as an opposition at \$1.00 fare. The regular rate prevailing previous to May of this year was \$1.50, but from that month to August the rates were lowered to \$1.00, after which they were raised to \$1.50, where they remained the rest of the season.

The landing of passengers in these days on the river, was what would be considered at present as attended with considerable risk. When time was of moment, and the number to be landed at any one landing but few, it was not uncommon for the small boat belonging to the steamboat to be lowered alongside the latter and the passengers desirous of embarking at the next landing placed on board, the small boat being towed by a small line, and the steamboat merely sheering in towards the landing. The small boat would sheer off close to the landing, and the passengers were compelled to jump when their boat arrived at the landing, whether at a wharf or on the shore. If the small boat was skilfully handled by those in charge, and they were prompt to avail themselves of their opportunity to alight quickly, they would land without being treated to an involuntary bath; but if the boat was not properly handled on arriving at the dock, or on the shore, the passengers would sometimes be thrown overboard. There was an accident which happened at the Poughkeepsie landing from this method of landing passengers, whereby several persons lost their lives. The legislature shortly afterward passed a law, prohibiting the landing of passengers from steamboats "on the fly."

1843.

People's Line, Without Landing, 6 P. M.	People's Line and Old Line (U. S. Mail) 5 P. M.	Troy Day Boats From Albany 7 A. M.	Opposition Day Boat 6 A. M.	Opposition Without Landing 6 P. M.
Rochester	Swallow	Troy	Curtis Peck	Diamond
South America	No. America	Empire		New Jersey
Knickerbocker	So. America	Rainbow		Swallow
				Portsmouth

This year was one of several changes in the relations of the steamboats on the route to one another, as well as the rates of fare. The season opened April 13th, with the fare by the Associated Lines at \$1.50, which was the rate by the opposition boat, the "Diamond," also, until in May, when the "Portsmouth" came on the route and joined the "Diamond," when the Associated Lines lowered their fare to 50 cents, as did the opposition. This was kept up for about two months, when the "Diamond" was taken into the Associated Lines and hauled off the route. In June the "Portsmouth" was succeeded by the "New Jersey," which run until September, when the "Portsmouth" returned and remained the rest of the season. The opposition of the "New Jersey" was determined during the months of June and July and August, and the fare fluctuated from 25 cents to \$1.00, being hardly ever the same for two consecutive days. When the "Portsmouth" succeeded the "New Jersey," in September, the rates were at 50 cents by the opposition, but were shortly after raised to 75 cents, and then to \$1.00, where they remained steady the balance of the season. While the "Swallow" run the fare was maintained on her at the regular rate of \$1.50, which prevailed also on the Associated Lines from the time the "Diamond" was taken off in June. In August the "Swallow" joined the "New Jersey," and remained till the close of navigation. The "Knickerbocker" came out as a new boat this year, and was entered in the Associated Lines, her first trip being made August 21st, where she ran part of the time with the "Rochester" and the remainder with the "South America." The engine of the "De-Witt Clinton" was removed in the winter of 1842 and 1843, and placed in the "Knickerbocker," and the hull was subsequently used as a barge.

The "Knickerbocker" was built by Smith & Dimon, for Daniel Drew & Isaac Newton. The ladies' saloon was fitted with 12 state rooms, while on the promenade deck there were single and family state rooms to the number of 65.

The opposition on the day line was entered into from the opening of the season by the "Curtis Peck," and was continued until the latter part of June, when she was taken into the Associated Lines and taken off the route. This boat was sold the next spring and taken down on the James River, Vir-

ginia. The rates of fare were kept at \$1.50 until the first of June, when they were cut to 50 cents by the opposition, which was met by the regular line on the same day, but \$1.00 charged on alternate days, while such opposition lasted. A few trips before being taken into the Associated Lines, the "Curtis Peck" run for 25-cent fare. When the "Empire" came out in



"EMPIRE OF TROY."

the spring the racing with the "South America" that was put on the day line for several weeks, was of daily occurrence, and carried out on both sides, "to do or die." The end probably justified the means they thought.

1844.

People's Line
Without Landing
6 P. M.

Rochester
Knickerbocker

Troy and Albany.
Troy at 6 P. M.
Albany at 7 P. M.
Albany
Swallow

People's Line
5 P. M.
(U. S. Mail)

North America
Curtis Peck
Columbia

Troy Day Boat
at 6 A. M.,
Albany, 7 A. M.
Troy
Empire

People's Line
Day Boat
7 A. M.

South America

Opposition
Without Landing
7 P. M.
New Jersey
Wave
Portsmouth
Genl. Jackson

This season opened the 18th of March with the fare by the Associated Lines at \$1.50, and the opposition by the "General Jackson" at \$1.00, which lasted until the latter part of April, when the "General Jackson" withdrew, and the People's Line was left in undisturbed possession of the field. This did not last long, for on May 18th, the "New Jersey" again put in an appearance, as during the previous season, on the opposition, and shortly after the "Wave," and the "Portsmouth," when the fare was cut down to 50 cents. This the Associated Lines met and held until the fore part of June, when the usual rate of one dollar and a half was re-established again by

them, and prevailed generally the balance of the season, with the exception of a short period during July, while the opposition were carrying passengers at prices varying from fifty cents to one dollar.

The Associated Lines run the "South America" as a day boat, from the middle of April to the middle of June, independent of the Troy line of day boats, with the fare at two dollars, while the latter line was running for one dollar and a half. This lasted but a very short time, when the Troy line increased the fare to that of the People's line. After the withdrawal of the "South America," the "Troy" and "Empire" were the only day boats for the remainder of the season, with the spring rates of fare.

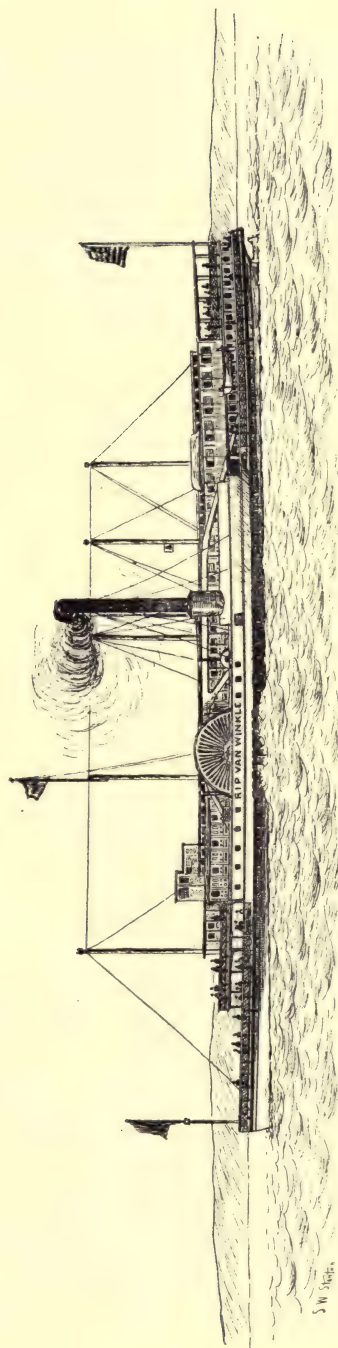
On October 4th the "Albany" broke her shaft when near Newburg, and the "Swallow" continued the service alone of the Troy and Albany night line for the remainder of the season. This was the second time during this season that the "Albany" had broken her shaft, for on July 30th she had met with the same mishap, which caused her withdrawal from the route for 10 or 12 days until repairs had been made.

The "Swallow" was purchased on July 15th of this year, by the People's line and the Troy line jointly, for \$50,000, the former taking two-thirds and the latter one-third of the vessel, with the understanding that the Troy line was to have the control of the boat. The vessel was at this time owned by Anthony N. Hoffman, of New York, and Smith Cutter, of Shrewsbury, N. J., and William Kemble, of New York.

During the month of November, after all opposition had been withdrawn, the Associated Lines raised the fare by the night boats; first, to two dollars, then to three dollars, and for the month of December, until the 15th, when they were compelled to cease operations by the heavy ice, four dollars was charged for passenger fare.

Steamboat captains, during these days of steamboating on the river, were not averse to taking risks to gain a point, if possible, over a competitor, when an opportunity offered. On one occasion, a fair boat for speed, of the Hudson River, had as an opponent a new boat which had just been brought around from Philadelphia, Pa., for service on the Hudson. On the Delaware River she was thought to be one of good speed,

but those on the Hudson River concluded that the stranger would find if she was fast on the Delaware River, that the same speed could not be obtained on the Hudson, for the miles were longer on the latter river than those on the former. The two boats were to have left New York this morning at the same hour, but the Old line boat was detained in her slip by another vessel, and the stranger got some distance on her journey before the former was able to get under way, and as it was very foggy at the time, the old boat lost sight of her competitor before she left her wharf. But that made no difference to them, for they were intent upon showing the stranger that there was one boat on the river that was able to pass her, and with the greatest confidence they started on their trip, thinking it was merely a question of a few miles before they would have the satisfaction of showing the stranger the stern of their boat while under way. They continued on their trip up the river, making good time, and this it must be remembered was in a fog. The lookout stationed in the bow of the boat would listen with the greatest eagerness for the sound of the stranger's paddle-wheels in the water, for it was not possible to see very far ahead, and this was the only way they could tell under the circumstances of her proximity, and when he thought he caught the welcome sound, then all was excitement to catch a glimpse of the stranger through the fog, even to a majority of the passengers who seemed to enjoy the stern chase, and who vied with the crew in urging the engineer to "go in, we'll soon catch her." As they got along up the river and the stranger had not yet been found since leaving New York, it was decided so as to make all the time possible, they must skip some of their landings for which they had passengers. This they did by paying the passengers to go to another landing further on, and paying their fare back by stage to their destination. After passing two or three landings they stopped at a wharf for the passengers desiring to go ashore, and inquired of the wharfinger if the new boat had been there, who told them that she "had called and left about an hour ago." This they doubted, and in language more vigorous and emphatic than polite to the wharfinger, hauled in the gang plank and started in pursuit of the stranger, more determined than ever to find her. The same tactics were pursued



“RIP VAN WINKLE.”

S. W. S. 1872.

again with the passengers in inducing them to go beyond their destination and return by stage; and after passing two or three more landings they made another stop for passengers at a wharf, and on inquiring of the wharfinger as to the new boat, were informed that "she was here and left more than an hour ago." Then they began to realize that they had met their match, even though it was not a New York-built boat, and went on their way, with less confidence than they had started out with in the morning in the speed of their vessel. Later reports do not say if they found any difference in the miles on the two rivers.

1845.

People's Line Without Landing 6 P. M.	People's Line 5 P. M. (U. S. Mail)	People's and Troy Line Without Landing, 6 P. M.
Rochester	North America	Empire
Knickerbocker	South America	Columbia
H. Hudson	Columbia	Swallow
	New Jersey	
People's Day Boat 7 A. M.	Troy Day Line 7 A. M.	Opposition Without Landing 7 P. M.
South America	Troy	Belle
	Niagara	Express
		Rip Van Winkle
		Oregon
		James Madison

This was a very lively season on the river, the number of boats leaving New York for Albany, or Albany for New York, daily, were often as high as six, four and five being a very common occurrence, even as late in the season as November. There were 52 days when six boats left daily, and 78 days when five boats left daily, between the first of March and the first day of December. This includes night boats as well as day boats.

The first steamboat to arrive this year at Albany was the Norwich* (that had been on the New York and Norwich route) on Monday, February 24th, at 1 a. m. She left New York on Saturday night previous, and forced her way through solid ice from Kingston up the river as far as Albany. The ice was very heavy and had not moved at Albany when she arrived.

* This steamboat was still in use as a towboat a short time ago, and always considered the best boat in ice on the river.

She lost her rudder and broke her water-wheels very badly, that made it necessary for her to lay up to repair damages. The ice commenced moving opposite the city about noon of the same day and in two hours was nearly all gone from that vicinity, the "Norwich" having in the meantime gone in the basin below the city where she was safe from the moving ice.

The month of March opened with the "Express" of the Schuyler line as an opposition boat, which was joined by the "Robert L. Stevens" for a few weeks, the fare being maintained at this time on these boats from fifty cents to one dollar, which the Associated Lines met on their night lines. During the month of April the competition was waged fiercely, with low rates of fare, the highest being fifty cents, and twenty-five cents being very common rate, and for a few days twelve and one-half cents (or 1 sh.) was all that was charged for passenger fare between Albany and New York, or vice versa. There was, from the middle of March to the middle of April, the "Buffalo," also running as another opposition boat, which also added to the already sharp competition existing between the through lines.

It was during this month, in the height of the competition, on the 7th day of April, the fare that night being twenty-five cents, that the "Swallow," which was on the 6 p. m. line from Albany, was coming down the river and when opposite Hudson on the Athens side of the river about 8.10 p. m., having taken the western channel, run on what was known as Dopers Island, a small island just above Athens, and sunk in a very short time after. Three boats left Albany that evening at the same hour, the "Swallow," the "Rochester," and the "Express," the latter being the opposition boat. The night was intensely dark, and the navigation of the river was made more difficult by a heavy snow squall, which prevailed for some time before reaching the vicinity of the disaster. The "Swallow" was in advance of the other two boats, followed very closely by the "Rochester," and the "Express" immediately in the rear of the "Rochester." It has been generally supposed that in this instance they were all being driven to their utmost speed, the "Swallow" to hold her own position, and the others to take it from her. The head pilot of the "Swallow" had been to supper, and returned to the pilothouse when a short distance

above Hudson. Before his sight became useful in the darkness which now surrounded him, she struck on the rocky island, and in a few minutes broke in two at the forward gangway, her bow having been driven about thirty feet upon the island. There were on board at the time about 300 passengers, and it is believed about 40 met a watery grave, several of whom were drowned in their berths. This disaster caused intense excitement in the towns along the river, and especially in New York and Albany. The "Rochester" and the "Express" rescued the larger number, though several were saved by going forward and climbing over the bow of the boat, dropped down upon the island, from which they were afterwards taken by boats which came out from shore. The "Express" was owned by Memenon Sanford, of New Haven, Conn., and others, who were also interested in steam navigation on Long Island Sound. It would appear that the "Express" started from Albany this night before her advertised time.

The next month opened with as strong a rivalry between the boats as during the previous month, except that the "Belle," which was from the New York & New Haven route, was running with the "Express" in place of the "R. L. Stevens." The low passenger fare of twenty-five cents (or 2 sh.) was the usual rate this month, except on the 5 p. m. line, which made the usual landings, and carried passengers with but few exceptions during the month, at 4 sh. (or fifty cents). June opened with a repetition of the fierce opposition of the previous month, but about the 15th the rates of fare were raised by the competing through lines to 50 cents and 75 cents (or 6 sh.) on the opposition, and fifty cents and one dollar (8 sh.) on the Associated Lines, while the 5 p. m. lines raised their rates to 4 sh. and 8 sh. also, rates being lower by the "Belle" and those of the Associated Lines on the same night, than they were by the "Rochester," of the through line, and the "Express," and "New Jersey," of the 5 p. m. line. After the loss of the "Swallow," the "Empire," that was running on opposite days with her in the same line, continued to fill it alone until the end of June, when the "Columbia" took the place of the "Swallow," and the two formed a daily line at 6 p. m. During the long days of the summer, the time of leaving was made one hour later than it was in the spring and

fall by all the night boats. On the 4th of this month the "Empire" was run into by the "Express" near Barren Island, carrying away her rudder and doing other damage to the vessel. These boats both left at the same hour and were of the rival lines, carrying passengers at this time for twenty-five cents. The month of July the opposition kept the rates steady at seventy-five cents the month through, while the Associated lines maintained the fare at one dollar, except on Saturdays, when there was no opposition, when one dollar and a half was the rate. The "Knickerbocker" broke her working beam and cylinder head on the 21st of this month, and her place was filled by the "South America" until her repairs were completed about the 20th of August. During August the same opposition as existed during July continued, with rates at the same figures. There were in this month 145 departures in all of night and day boats from Albany to New York. Four of the Associated Lines' boats were compelled to be withdrawn during this month for repairs, for a longer or shorter period than one week each. During September the same condition of affairs existed as during August until the 22d, when the "Oregon" came on the scene of warfare in rates, and the day following the "James Madison," that had been running between New York and Newburg. The rates were once more lowered to as near a "chalked hat" (or free pass), as it is to make it, especially on the "James Madison," which run for twelve and one-half cents (1 sh.), while the "Belle,"* on the other opposition line, was running at twenty-five cents, both of these boats on the same night, while the Associated Lines fell no lower on the same nights than 4 sh. (or fifty cents). This seems to have been a war more particularly between the two opposition lines. On the opposite nights the "Oregon," which was a new and very fine boat, and one of good speed and size, run for passengers at the fare of one dollar. This boat was afterward purchased by Daniel Drew, and others, from George Law. It is more than probable that she was put on to keep the opposition lines in check as much as possible. Shortly after the "Express" was competing at seventy-five cents (6 sh.) passenger fare, and the Associated Lines' boats, both U. S. Mail and

* The "Belle" was in use as a towboat until 1898, when laid aside from active service.

through lines, at 8 sh. Thus the rivalry continued during the latter part of the month, six boats in all leaving daily from the 22d to the first of October. Four of the Associated Lines' boats were withdrawn this month at different periods, for repairs to their machinery by break-downs, and damages to their hulls by collisions, their places being supplied by other boats of the Association. October was opened by as determined an opposition as has been noted during the latter part of September, with a more steady rate of low fares during the whole month than had previously existed. The "James Madison" still run for twelve and one-half-cent fare, the "Oregon" lowered the rates from one dollar to twenty-five cents, and the "Belle," and "Rip Van Winkle," which had taken the place of the "Express" on the 6th of the month, having been in the opposition day line previous, kept a very even rate during the most of the month at twenty-five cents. The Associated Lines cut down the fare during the greater part of the month to twenty-five and fifty cents. During this month there were 159 departures from New York for Albany, the largest number during any one month of the year. On the 8th of this month the "Hendrik Hudson" made her first trip, in the through line of the Associated Lines' boats, taking the place of the "Rochester," with the "Knickerbocker" as a mate. The "James Madison" left the opposition line on the 16th, and the "Oregon" left the route on the 28th. In November there was but one opposition line running, the "Belle," and the "Rip Van Winkle," and better paying rates were established. They opened the month by raising the fare to seventy-five cents, and soon after increasing it to one dollar by the "Belle," and one dollar and a half by the "Rip Van Winkle." The Associated Lines opened the month at seventy-five cents, and a week after increased it to one dollar and a quarter on the same nights as the "Belle," and to one dollar and a half as the "Rip Van Winkle," which rates were held steady during the month. During this month there were 127 departures from New York for Albany. The winter set in quite early this year, closing navigation on the river on December 3d.

This was a memorable season for steam navigation on the Hudson River, both for the determined opposition offered, the large number of steamboats, as well as the low rates of fare.

and the length of time they were continued. There were a few days when the competition was so sharp, that some of the lines, rather than be outdone by their competitors, have carried passengers free of all charge for passage, their only receipts being for berths and meals.

The day lines opened the season of 1845 on the 14th of April with the "Troy," which was soon joined by the "Albany," the rate of fare being one dollar, which was kept until July 5th, when it was increased to one dollar and a half, until the "Rip Van Winkle" was put on as an opposition boat during the latter part of the month, she being then a new boat, and built for the Schuyler line, and this, her first service, when the fare was lowered on the same day to one dollar, the opposite day the regular line charged one dollar and a half passenger fare. This continued until the fore part of September, when the "Rip Van Winkle" was withdrawn, but came on again as a night boat with the "Belle" during the next month. After the "Rip Van Winkle" withdrew from the opposition day line, in September, the regular line raised the fare to one dollar and a half, which was kept steady at this rate until the end of the season. The "Albany" was withdrawn from the day line and from service in June of this year, and the "Niagara," that had just been completed, was entered in her place and continued the remainder of the season until the close of navigation on the day line with the "Troy."

On August 5th the "Rip Van Winkle," then on the opposition day line, had a trial of speed with the "Troy." They left New York side by side, at 7 a. m., and continued close in each other's company until they reached Caldwell's landing, about forty-two miles from New York, when the "Rip Van Winkle" took the lead, which she held during the remainder of the trip and reached Troy at 4.30 p. m., the "Troy" arriving at 4.40 p. m., both making the usual landings. This was a very close and exciting contest, the boats being at times within almost hailing distance of each other.

1846.

People's Line Without Landing 6 P. M.	People's Line (U. S. Mail) 5 P. M.	People's and Troy Line Without Landing, 6 P. M.	Troy Day Line Boats, 7 A. M. from Albany.
H. Hudson	South America	Empire	Troy
Rochester	North America	Columbia	Niagara
Knickerbocker	H. Hudson		South America
Isaac Newton	Santa Claus		
Opposition Day Boats, 7 A. M. from Albany.	Opposition Without Landing 6 P. M.		Opposition Without Landing 6 P. M.
St. Nicholas	Belle		Express
Metamora	Rip Van Winkle		Oneida
Iron Witch			

This year the navigation of the Hudson River opened March 18th, and in a week after there were two opposition lines on the through route from Albany to New York, and the fare for passengers, which had been on the opening of the season two dollars, and one dollar and a half, fell by the end of the month to one dollar, and to fifty cents, but it was not until April 5th that the competition began with spirit and energy, and then the fare declined to twenty-five cents on all the through night lines, which price was steadily maintained through the balance of the month. The "Oneida," which was an opposition boat during this year, was formerly known as the "James Madison," which was on the opposition the previous year. The month of May was opened with the same low fare as existed during April, but about the 15th of the month one of the opposition boats having been withdrawn from one of the lines, leaving three boats on the opposition during the balance of the month, the fare was raised almost generally to fifty cents by all the lines, and towards the last of the month to seventy-five cents. During this month two of the boats were laid up for repairs for a short time, made necessary on account of collisions, when others took their places.

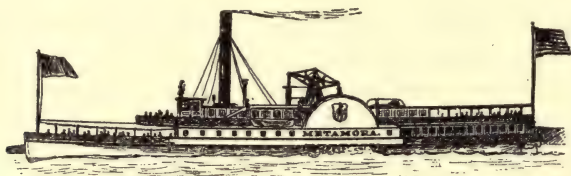
On the first of June the Associated lines bought the "Express," which had previously been an opposition boat for several seasons, and a most determined one at that, for \$22,000.00, and also chartered the "Rip Van Winkle" and sent her around to the Delaware River to run from Philadelphia to Cape May for the excursion travel between these places. The "Belle"

still remained as an opposition, but on opposite days to the "Express." The fare was now raised to one dollar on all the night lines, and maintained during the month, except during the latter part, when one dollar and a half was the rate by the Associated lines, leaving the opposition, which were smaller and less commodious boats at one dollar. Thus the era of a better feeling seems to have been ushered in by the advent of warm weather, and was kept up during July, with the exception that every other night the Associated Lines lowered the fare to one dollar and a quarter, and raised the fare of their opposition on the same night, which had been one dollar to one dollar and a quarter. A small boat, called the "Wave," attempted to come on the route to disturb the peace and quietness, which reigned so supreme for the interest of the steamboat owners on the route, and by cutting the rate to twenty-five cents, but her career was cut very short by the Associated Lines putting on the "Express" as an opposition on the same night and carrying passengers free of fare. This was more than the owners of the "Wave" had bargained for, as her third trip completed her season's service on the route. During August the Associated Lines continued the same rates as in the month of July. The number of departures in all during this month, day and night boats, was 165, of which only 34 were made by the opposition day line.

The "Oneida," during August, took the place with the "Belle," which the "Express" had held, and continued to run with her during the balance of the season. The months of September, October and November found the same rates of fare prevailing as existed during August, on both the Associated Lines and opposition. The People's or Associated Lines had built for them, during this year, the "Isaac Newton," which was considered at that time to be a floating palace. She took her place on the line October 8th, and ran until the 25th of November, when one of the smaller boats, the "Columbia," was substituted for the balance of the season, which ended December 14th. The "Isaac Newton" was contracted for by Capt. Peck, to be used as an opposition boat on the river, and named the "George Washington" until just before launching, when her name was changed to "Isaac Newton." We find the Peck interests represented in the affairs of the Company

at a later date, as well as in the Stonington R. R. Co. the same time as Daniel Drew was in control of the company.

The Troy day line, which always made a landing at Albany, was opened this year with the "Troy," on the 10th of April, while the opposition boat, the "St. Nicholas," had then been running for over two weeks, but continued for only a week after the Troy line opened the season, the fare during this period being held at one dollar and a half. The old line kept but the one boat running, every other day, from New York until the 27th of May, when the "Niagara" was again placed on the line to form a daily line with the "Troy." The fore part of May, the "Rip Van Winkle" run as an opposition boat for about ten days, but there was no cutting of the rates of fare. From the middle to the end of the month of May the People's line run the "South America" as a day boat, when she was withdrawn from the day route. During the month of June the Troy day line had undisturbed possession of the route, and they made the best of the time, for on the fourth of the month the rate was raised to two dollars, which remained constant during the balance of the month. The next month also added to the fortunes of the line, for the same rates continued as



"METAMORA."

during June. On the 23d the "Metamora," then a new boat, made her appearance on the route as an opposition, while at the same time the People's line again opened a day line this season by placing the "North America" in opposition to the "Metamora," with the fare at one dollar, the same as by the opposition, while the Troy line continued at two dollars. There was no change until the 10th of August, when another new boat, named "Iron Witch," having an iron hull and fitted with small side wheels, was put on with the "Metamora" to form a daily opposition line. The first trip of the "Iron Witch," from

New York to Albany, was made in 9 hours and 23 minutes. A few days after the People's line withdrew the "North America," and the Troy line was left to compete with the opposition, when the rate of fare was cut during the balance of the month to one dollar, and one dollar and a half on alternate days. This state of affairs remained until the 23d of September, when the "Iron Witch," having been withdrawn a short time previous for repairs, the "Metamora" broke her shaft and was compelled to lay up for repairs. The Troy line now having no competition again raised the fare to one dollar and a half. This continued until the "Metamora" again came out on the 6th of October, when the rate was again lowered on the same day by both lines to one dollar, while on the opposite days to the opposition the Old line continued to charge one dollar and a half, which figure held during the balance of the month. On the 31st of October the opposition ceased running and left the Old line during November in full possession of the route, when the fare was returned to one dollar and a half, where it remained during the balance of the season, the last day boat leaving Albany on November 25th. On the latter date the "Niagara," which that morning left New York, went aground on the Middle Ground opposite Hudson during a heavy storm and laid there high and dry, at low water, until the 28th of the month, when she floated off at high water. On the 5th of September the "Troy" broke down one of her engines so badly that she was not able to take her place on the line again during the season, the "South America" being chartered from the People's line for the occasion.

This season's work appears to have finished the "Iron Witch," being operated by small side wheels; in all, her service was less than three months. During the winter the side wheels were removed and side propellers, that were geared, substituted, but after a few trials these were found to be no improvement.

1847.

Peoples' Line Without Landing 7 P. M.	Peoples' Line (U. S. Mail) 4 P. M.	Peoples' Line Troy & Albany Without Landing 7 P. M.	Troy Day Boats Troy 6 A. M.
H. Hudson	South America	New Jersey	Niagara
Isaac Newton	North America	Columbia	Troy
	Rochester	Empire	
	Columbia		
Troy & Opposition Night Boats 7 P. M.	Opposition Day Boats 7 A. M.	Opposition Without Landing 7 P. M.	
Rip Van Winkle	Roger Williams	Oneida	
Empire	Metamora	Rip Van Winkle	
	Alida		

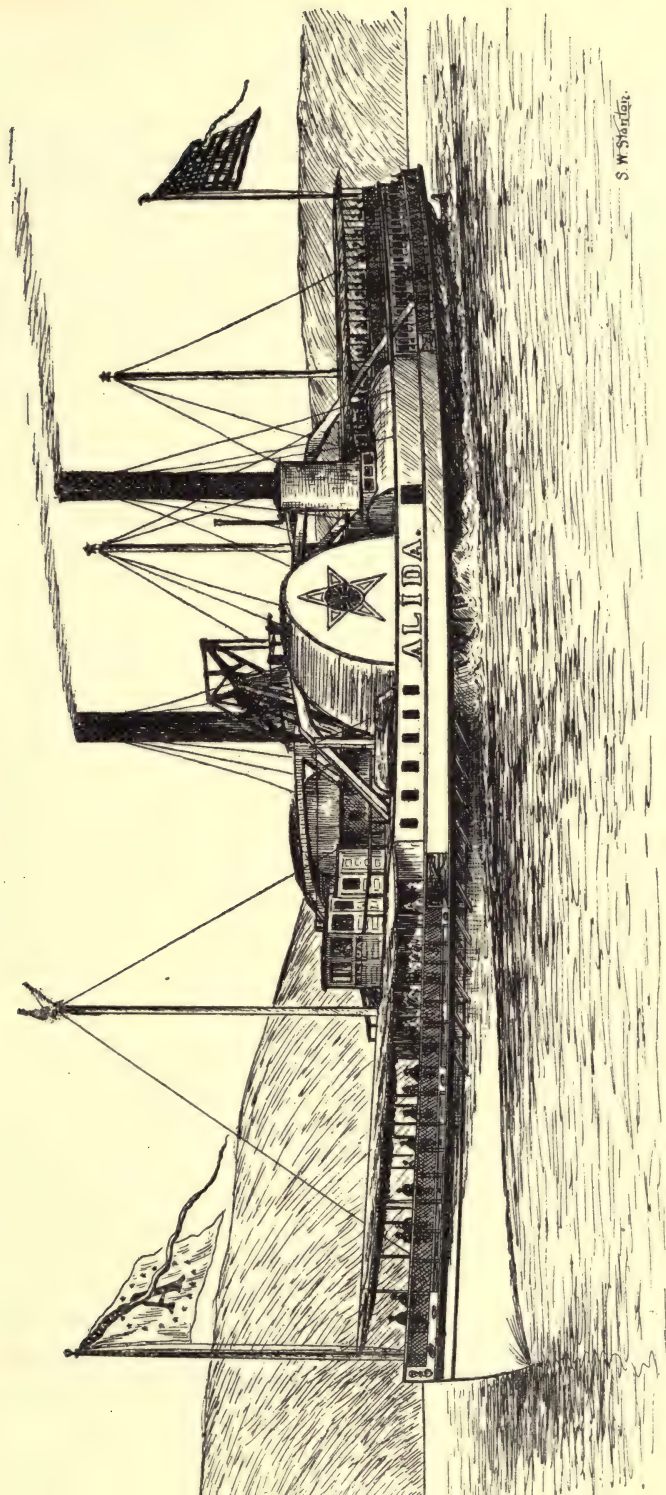
The season, this year, of the opening of navigation was later than it had been since 1843, the first boat leaving Albany, April 8th. The "Columbia" and the "Rochester" had been running to Hudson for about two weeks previous to that date, not being able to cut their way any farther through the heavy ice. On April 4th the "Columbia" and the "Commerce," the latter a much smaller and older boat than the "Columbia," but a good ice-boat, had cut their way through to Castleton, about eight miles below Albany, and the same day succeeded in reaching Van Wiese's Point, four miles above, where the "Rochester" and the "Columbia" made their landings for three days, the passengers being transferred by sleighs to Albany, when the "Columbia" endeavored to cut her way through the ice to the Capital, but was unsuccessful in the endeavor. While on her return to Van Wiese's Point the ice in the river began to move, taking her along to Van Wiese's dock where, by the use of two good lines fastened to trees in the vicinity of the dock, they were enabled to hold on until the ice had passed by them. Her wheels were badly broken, rudder unshipped, and fastenings broken, which made it necessary to rig the small boat to steer the vessel, by which means they were enabled to proceed to Albany after the ice had passed, where she arrived the same evening about 6 o'clock.

The next evening, the 8th, the night boats began to run from Albany, with an opposition at the same time by the "Rip Van Winkle," which was followed the next evening by the

"Oneida," and lasted during the entire month. The fare during this period was by the Associated lines one dollar, and one dollar and a half on alternate nights. At this time the People's line had the "Isaac Newton," and the "Hendrick Hudson," the finest of the night boats on the river; also the "North America," and the "South America"; while the Troy and People's line were running the "Columbia," and the "Empire." The fare by the opposition lines opened at one dollar, but dropped towards the end of the month to fifty cents, where it remained until the opening of May. During this time the fare was by the Associated lines from fifty cents to one dollar, while by the opposition, which consisted of one boat and that run but a few trips, the fare was but twenty-five cents. The "Rip Van Winkle," which had been on the Albany opposition during the previous month, was this month doing service on the Troy opposition night line, stopping at Albany, on which line she remained during the rest of the season. In June, till the 14th, there was no material change from that of May, when the "Oneida" returned again and lowered the fare to twenty-five cents, which was held during the balance of the month, while the Associated lines charged fifty cents, except on the same night as the opposition, when by one of the lines the fare was twenty-five cents. During July, until the 20th, low rates were the rule, as of the previous month, on which date the "Oneida" withdrew, when the usual advance on the withdrawal of an opposition was made, except during this month on the Mail line that made landings along the river, there was no fare charged the through passengers. The through lines raised their fare to seventy-five cents and one dollar by the last of the month. For a portion of August the opposition boat "Oneida" was running on the route again, but the fare was lowered on only one of the Associated lines, that leaving at the same hour as the "Oneida." The other lines maintained the rate of one dollar during the whole of the month. During June there were 167 departures; during July 165 departures, and during August 164 departures from Albany for New York, which included both day and night boats. There were eight days in June when seven boats left daily, five night and two day boats; three days in July when seven boats left daily, five night and two day boats, and five days during August

when seven boats left daily, five night and two day boats. The month of September was a repetition of August until the 20th, when the "Santa Claus" entered as a competitor for the travel, and the fare then fell off in price to fifty cents, on all lines, with a few days by the People's and Troy line at twenty-five cents. Rates of fare in October took an upward turn from the beginning of the month, the opposition boat, "Santa Claus," leaving the route after a few trips this month, so that by the 15th, one dollar and a quarter and one dollar and a half were the regular rates by the Troy, the People's, and the opposition lines. November was very steady in rates of fare, at same figures as prevailed the previous month, the "Rip Van Winkle" during all this month running from Albany as an opposition boat. In December the opposition was withdrawn at an early date, but the People's line continued to run two boats every night till the 23d, the last leaving on the 24th, when the season closed on account of the ice running too heavy. The rates of fare this month was one dollar and a half, and two dollars.

This was a very lively year for the day boats, as there were on the route two new boats, one of which has a reputation for high speed, the "Alida"; the other was the "Roger Williams," and although smaller than the "Alida," was a fair boat for speed. The "Metamora" opened the season on April 10th, as the first day boat, with the "Roger Williams" on the 13th, and the "Alida" on the 20th, with the fare at one dollar, until the "Niagara," of the Troy line, commenced on the 26th, when the fare fell to fifty cents, where it remained during the balance of the month. During May there were, until the 17th, two boats, each way a day, and after that date the "Troy" was placed on the route as a mate to the "Niagara" to form a daily line; there were three boats every other day at the same hour, with two boats a day on alternate days, except Sundays, with the fare at fifty cents during the entire month. The "Metamora" was withdrawn the last of May and did not appear on the route again this season. In June there were but two departures a day, the "Alida" and the "Troy" running on the same days, while the "Niagara" and the "Roger Williams" competed daily. The same rate of fare as existed during May was in force in June. The months of July, August,



S. W. Starling.

"ALIDA."

and September, until the 12th of the latter month, saw the same determined opposition with these boats, without any change in the rate of fare, on which date the "Roger Williams" was withdrawn, leaving the "Alida" as the only opposition, but made no change in the rate, except with the "Niagara," when the fare was raised to one dollar, where it remained during the balance of the month. Thus it continued during October until the 15th, when the fare was raised to one dollar and a half, the "Alida" having made her last trip on the 2d of the month. November was a continuation of the latter part of October on the day line. The last boat left Albany and Troy on the 26th of the month. The "Oregon" run for two weeks in the People's day line this month. This was the last season of the Troy day line.

During the height of the rivalry, in the summer, the opposition line advertised their departures in the following manner: Of later years the stab made at their opponents is more neatly done.

"Steamer Alida."—The splendid day boat "Alida" is now the only day boat for passengers to depend upon. She makes all the landings and arrives in Albany and Troy two hours ahead of the old boat "Troy." The "Troy" is twelve years old, and her machinery is now so worn as to be constantly breaking down. On Wednesday her passengers did not arrive in Albany until 10 o'clock at night, too late for the cars, and this morning she was seen with but one engine at work. Those traveling should patronize the only opposition on the river, and more especially as she is far the best and fastest boat. Fare, fifty cents."

This appears to have been a very lively year for challenges. George Law, "Live Oak George," having beaten Cornelius Vanderbilt in a race between the "Oregon" and the "C. Vanderbilt," on June 1st, 1847, still had a hankering after more scalps, so in the following August he issued a challenge, in a public manner, to the owners of the "Hendrik Hudson," as follows: ". . . to race the "Oregon" against the "Hendrick Hudson," over the same route as the one selected in the race with the "C. Vanderbilt," or any other route to be agreed upon, for \$2,000 against \$1,000; if that should not be of sufficient interest, \$3,000 to \$2,000 . . . or \$100 to \$75 on any amount

up to \$50,000." If neither of the above are accepted, Law offered to run the "Oregon" with only one wheel against "Hendrik Hudson" for \$1,000. His challenge was not answered.

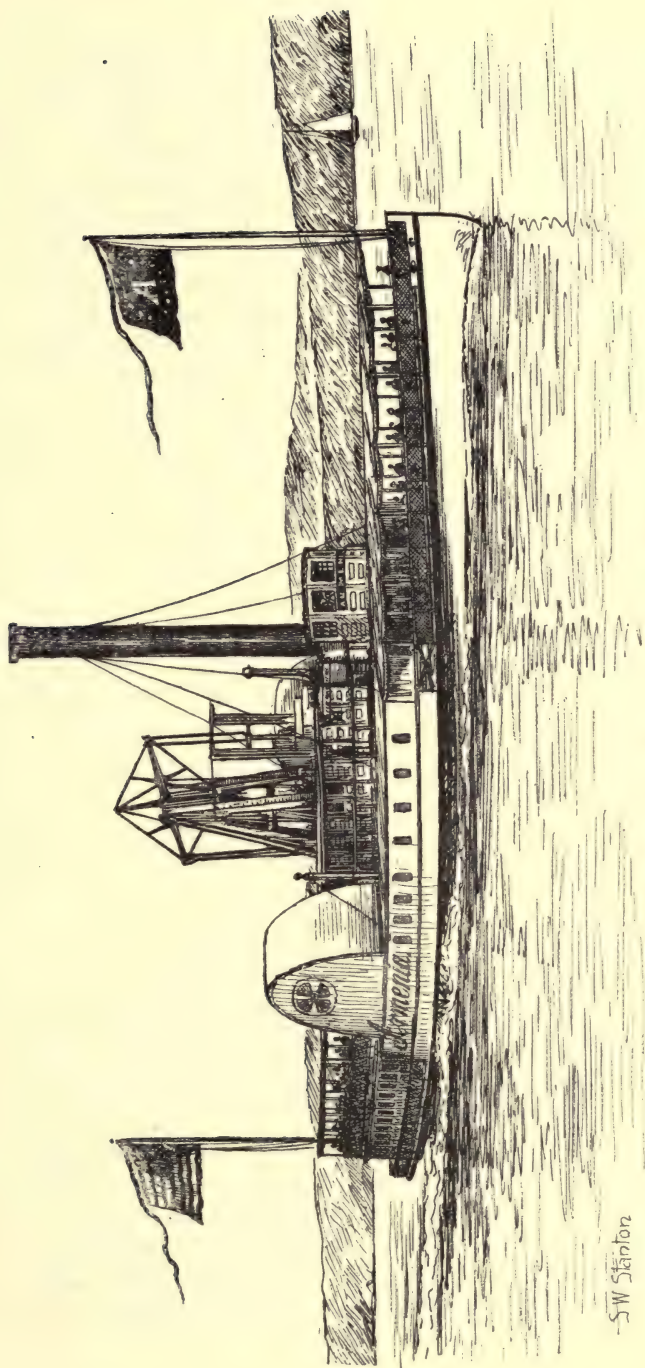
For fear that the traveling public should entertain the idea that the "Roger Williams" engaged in racing on the river, her owners informed the public "that the owners of the "Roger Williams" pledge themselves as well as Capt. DeGroot, that they will not race with any boat that may be placed against them by the Old Monopoly line, but make all the landings advertised." This vessel, about five years later, was sold to Providence, R. I., parties, who had her refitted in hull and machinery, and name changed to "Paraguay," and sent her to South America, but she sprung a leak off the coast of Brazil, got into port, but was finally condemned as unfit to continue the voyage.

1848.

Peoples' Line Without Landing 6 P. M.	Peoples' Line (U. S. Mail) 4 P. M.	Peoples' Line 2d Class 6 P. M.	Peoples' Line Day Boats 7 A. M.
Isaac Newton	North America	New Jersey	H. Hudson
Rochester	South America		Alida
Oregon	Santa Claus		Roger Williams
Troy Line & P. Line without landing at Albany 6 P. M.	Opposition 2d Class 6 P. M.	Sham Opposition Day Boat 6 A. M.	Opposition Day Boats 7 A. M.
Troy	Rip Van Winkle	Confidence	Alida
Empire	Manhattan		Armenia
	James Madison		

This year the "Columbia" and the "Norwich" each made three trips from New York to Albany, from January 2d to the 7th, inclusive, on which latter date the weather growing colder, the river was closed again with ice. In February the "Columbia" ran to Poughkeepsie from New York a few trips, and to Coeymans also, when the river closed again. From March 10th to 21st, she ran to Hudson, and the ice breaking up on the 22d, the navigation of the river was resumed. The opposition boats were not backward in opening for business, for on the 25th the "James Madison" ("Oneida") opened the ball with the fare at one dollar, which continued during the balance of the month with her and the "Rip Van Winkle,"

while the People's line and the Troy line held the fare at one dollar and a quarter, and one dollar and a half. During the previous winter the People's or Associated lines had purchased a one-half interest in the "Empire," the "Troy," the "Niagara," and the "John Mason," the latter a small boat which was used in the upper part of the river to aid the larger boats, when necessary, at the shoal spots or bars in the river. The "Niagara" was subsequently sold to the Housatonic R. R. Co. of Connecticut. The "Oregon" was purchased by the People's line from George Law, during the early part of this year. The "Troy" was also fitted up as a night boat to run with the "Empire" as a night line to Troy. The next month was ushered in by a more determined opposition, by cutting of fare to 4 and 8 shillings by all the Albany night lines, but this amusement seems to have spent its force about the 18th of the month, when the opposition raised the fare to 8 shillings and the People's line to \$1.25 (10 shillings), while the Troy line held to one dollar and a quarter, and one dollar and a half. There were a few trips made this month by the "Buffalo," at a passenger fare of 2 shillings, but this cut does not appear to have been noticed by the other lines. This was another of the Hancox line, to which the "Napoleon" belonged, and was a most bitter opponent of the People's line. Their boats were small and poorly equipped in comparison. May appears to have been a repetition of April, except for a few days when the opposition cut to 4 shillings, but immediately raised again to the old fare of 8 sh. (one dollar). In June the People's line opened a second-class line with the "New Jersey," at a fare of 8 sh., while the first-class line held the rate of one dollar and a half, and the opposition held even rate with the "New Jersey," which was evidently done to hold the opposition in check and protect the first-class line in their rate of fare. These figures prevailed very generally during July also, during which month the "Manhattan" took the place of the "James Madison," which had retired in June, in the opposition, and remained there until September 1st. The month following was broken by another "war of rates," which was short in duration, lasting but the month of August. The second-class line, the "New Jersey," was joined on the same nights by the "Rochester," of the Associated line, making two



"ARMENIA," AS ORIGINALLY BUILT.

-SW Stanton

boats on six different occasions during the month, cut the rate to twelve and one-half, and twenty-five cents, against the "Rip Van Winkle," and the "Manhattan," neither of which lowered their fare below twenty-five cents, on any one trip, during the whole four weeks. The month closed by the rate being raised to one dollar by the opposition, while the Associated lines held the figures as before. There were in this month 176 departures in all from Albany to New York, both day and night boats, six days when seven boats left daily. During September there was no outbreak, there being but one opposition night boat, and that the "Rip Van Winkle," she holding on till the very last of the season. The rates were by the "New Jersey," seventy-five cents; by the "Rip Van Winkle," one dollar, and the Associated lines held to the old figures. October appears to have been more favorable in rates of fare for the different lines, as they all advanced till the "Rip Van Winkle" was receiving one dollar and a half, the "New Jersey," of the second-class line the same, while the first class of the Associated lines had advanced to one dollar and seventy-five cents. On November 22d, the opposition cut down the fare once more to one dollar, while the "New Jersey" held fast to the figures of last month, but the first-class line fell to one dollar and a quarter on the same night as the opposition, but the opposite night the old rate of one dollar and seventy-five cents remained. During December there does not appear to have been two consecutive days when the fare was the same by any of the lines. The highest rate during the month was two dollars. The river closed on the 28th of the month, the "Columbia" being the last boat from Albany.

The day lines this year were opened by the "Roger Williams," for the People's line, on March 29th, with the fare at two dollars, which continued during April, when the "South America" took her place during the latter part of the month, where she remained until the 6th of May, when the "Hendrik Hudson" took the route in place of the "South America" with the "Oregon," which had been put on the route a few days previous. On April 11th the "Alida" opened her season on the route as an opposition boat, and was followed on the 24th by the "Armenia," which was a new boat. The rates were held by both lines very generally at two dollars, up to the

time the "Hendrik Hudson" coming on for the People's line, when they were lowered for a few days to one dollar. On May 15th, arrangements were entered into whereby the "Alida" was allowed the privilege of taking the place held by the "Oregon" as mate to the "Hendrik Hudson," in consideration of a payment of a percentage of her gross earnings for the privilege. Under this agreement the "Alida" continued in the People's day line until the end of the season. This left the "Armenia" alone on the opposition on the same days as the "Hendrik Hudson," which she continued until the 26th, having in the meantime cut the fare to fifty cents, which was met by the "Hendrik Hudson," when the "Armenia" was withdrawn; the "Alida" held the fare at one dollar during this cut. The next month the "Alida" and the "Hendrik Hudson" had no competition to deal with, and the "dear traveling public" were compelled to pay two dollars for passage from New York to Albany or Albany to New York by the day line. July was as remunerative, in point of rate of fare, for the line as that of the previous month till the 27th, when the "Confidence," a much smaller boat than either the "Alida" or the "Hendrik Hudson," but recently built, was placed on the route on the same day as the "Alida" as an opposition, when the fare fell to one dollar and a half. This was another war of rates, and, what made it interesting, was the opposition held on till the end of the season, running on the same day with the "Alida" till October, when she was changed to the same day with the "Hendrik Hudson." On the alternate day to the opposition, the usual fare of two dollars was charged. August opened with fare by the "Confidence" at one dollar, while the "Alida" held at one dollar and a half. The "Confidence," on the 8th, cut to fifty cents, while the "Alida" dropped to one dollar. This was continued till the 29th, when the "Confidence" lowered once more to twenty-five cents, while the "Alida" held to the fare at one dollar. These figures were the ruling rates with these boats until the 12th of September, when the "Alida" made another reduction to fifty cents, while the "Confidence" held fast at twenty-five cents, which rates both continued until the 29th, when the "Confidence" "bulled" the rates to one dollar, and the "Alida" to one dollar and a half. The opposition was changed during

the first week of the next month to the same day with the "Hendrik Hudson," and the rate was once more cut to twenty-five cents by both, and in a few days to twelve and one-half cents by the "Confidence," while the "Hendrik Hudson" remained at her former fare, which remained constant with them until the 20th, when the opposition raised the fare again to one dollar, followed by the "Hendrik Hudson" to one dollar and a quarter, the prevailing figures by these boats during the balance of the month. As the "Alida" had no opposition with her on the same day, the fare remained with her at two dollars. November made no change in the fare until the "Hendrik Hudson" was withdrawn on the 15th, when the opposition raised the fare to one dollar and a half, while the "Alida" continued at two dollars. On December 2d the latter boat was withdrawn, but the "Confidence" still remained on the route with the fare at one dollar and a half till the 11th, when it was advanced to two dollars, which was held until she was withdrawn on the 22d. This opposition was started, it is supposed, for the purpose of compelling the owners of the "Alida" to withdraw the "St. Nicholas," which they had running as an opposition on the Norwalk and New York route.

1849.

Peoples' Line Without Landing 6 P. M.	Peoples' Line (U. S. Mail) 4 P. M.	People's & Troy Line From Troy 6 P.M. Albany 7 P. M.
Oregon	South America	Troy
Isaac Newton	Rochester	Empire
H. Hudson	Manhattan	Columbia
People's Line Day Boats 7 A. M.	Opposition 2d Class 7 P. M.	Opposition Day Boats 7 A. M.
H. Hudson	Buffalo	Alida
New World	Rip Van Winkle	Confidence
Alida	Rochester	Cataline
	Manhattan	
	Eureka	

The first boat through from New York to Albany this year was the "Columbia," which was the "early bird" on the two previous years, arriving at the latter city on March 18th.

On the 21st business opened with the opposition on hand as usual, who were ready to obtain all the travel possible, and to dispute the absolute control of the route by the Associated lines. The "Rip Van Winkle" was the pioneer of the opposition this year, followed by the "Buffalo" the next day. The fare by all the lines running at this time was fifty cents, and one dollar on alternate days. April opened with the fare by all the lines at fifty cents which, on the 4th, was reduced by the opposition to twenty-five cents, and was held very steady during all this month, except for a few days in the latter part, when fifty cents was the rate. The People's line held the rate prevailing at the opening of the month very firm till its close, while the Troy line, which made a landing and in which the People's line also had an interest, lowered the fare to twenty-five cents, and fought the opposition with their own rates during the whole month. May opened with the "war of rates" still in operation: the People's line at fifty cents, the Troy line at twenty-five cents, which they maintained until about the 15th, when they raised to fifty cents, while the opposition continued the low price of twenty-five cents until the 15th, when they lowered the rate to twelve and one half cents, on alternate days, for the remainder of the month. On the 18th of May the Troy line ceased landing at Albany. On the same day the "Empire," while on her way up the river, was run into by the schooner "Noah Brown," of Troy, in Newburg Bay, and sunk to the promenade deck in a few minutes. She was taken in tow by the "Rip Van Winkle," which had also taken off most all her passengers, and beached near Fishkill, opposite Newburg. There were 24 lives lost by this accident. It has been supposed to have been a case of carelessness on the part of those in charge of the schooner at the time, in persisting in keeping on their course when by simply "going about," for which they had ample room, they might have cleared the "Empire," and thus have saved the large number of valuable lives which were thus wantonly sacrificed. The vessel was subsequently raised and towed to New York, placed on the Sectional dock and repaired, and on the line again on the 31st of August. Her place was taken during the time of repairing by the "Hendrik Hudson" for a time, and afterwards by the "American Eagle." The "Eureka" also appeared on the scene

of conflict on May 2d, and made eleven trips from Albany during the month, at the low fare of twelve and one-half cents. During June there was music in the air, for the rates were by all the lines mostly at "rock bottom" rates, the opposition carrying passengers at twelve and one-half cents, and alternate days at twenty-five cents, while the People's line led off the month at fifty cents, but on the 10th lowered to twenty-five cents, and continued at that figure during the balance of the month. During this month there were two opposition lines, four boats in all, while the People's line was running only their regular 6 p. m. line and the Mail line. During the next month the opposition lines seem to have been very irregular in their running for a time, but the low rates of the previous month prevailed with them, while the People's line took advantage when no opposition offered and raised the fare to one dollar and a quarter, but otherwise low prices prevailed with them. In these times of sharp opposition, a person might leave New York for Albany in the morning and be required to pay but twenty-five cents for the passage, and possibly on his return from Albany, within thirty-six hours, the opposing lines may have come to an understanding in the meantime, and the fare be raised to two dollars for the return trip by the lines. Thus it could not be told what the fare would be for the morrow, from one day to another, or over night by the day lines.

The "runners," who were employed on the piers in the sale of tickets for the different boats, especially when the competing boats lay at the same pier, were most annoying to the intended passengers. Their shouting and boisterous manner was anything but pleasant, especially to the timid. They had no scruples about deceiving passengers regarding the lines opposed to their interests, and a favorite deception with them, especially to females, was that the opposition boat was unsafe, especially the boiler, that was liable to explode at any moment. This valuable information, in a majority of cases, made a sale of tickets, even though it might be by an inferior boat.

One of the tricks in carrying passengers during a fierce opposition is thus told: One line was carrying passengers free of all fare, when the regular line went them twelve and

one-half cents better, and for a few days carried passengers by paying them twelve and one-half cents to ride, just to get more of a crowd than the opposition. It was all well enough to be the guests of the line, and to be paid for the honor, but when they became hungry and sleepy, then was the time the management got in their fine work, for they never lost sight of the one shilling they had paid to their guests. They now exacted from the hungry and tired travelers double and treble prices for their meals, and a board to lay upon, and one victim afterwards said it was cheaper to pay one dollar fare than to be a guest of an opposition line.

In the month of August the opening rate of fare by the opposition, which now consisted of but two boats, was twenty-five cents, the "Rip Van Winkle" and the "Manhattan," which held firm till the 20th, when an upward turn was taken and the fare was placed at one dollar during the balance of the month. The People's through line opened at fifty cents, but on the 22d increased the fare to one dollar and a quarter, which rate they continued during the balance of the month. The Mail line, during this month, followed with the same rate of fare as prevailed with the opposition. Two of the boats, of the People's line, the "Rochester" and the "South America," were withdrawn during this month for repairs, in consequence of damages received by collisions. On the 8th of September the "Manhattan," of the opposition line, was taken into the People's line and placed on the Mail route, while the "Rochester" was put in her place and run alternately with the "Rip Van Winkle." There was also another opposition boat, the "Kosciusko," an old-timer, which entered into the "war of rates," and made it lively for a time by cutting the fare for a few weeks to twenty-five cents, which compelled the "Rochester," for the time being, to lower her fare to fifty cents. About the 12th, the People's line took another opposition boat under its protecting wing, the "Santa Claus," which was placed in the Mail line with the "Manhattan," they being now the competitors of their former companions in the opposition. The first-class line of the People's line kept up their rate of fare to one dollar and a quarter and one dollar and a half during all the month. In October more brotherly love appears to have prevailed among the lines, for the first-class line was demanding

one dollar and a half, while the Mail line, and the "Rip Van Winkle," of the opposition, and the "Rochester" were receiving one dollar and a quarter. November was the same as October in rates of fare. December continued as November until the 6th, when the rate was raised by the first-class line to two dollars, and on the 13th to three dollars, which remained till the close of the season. The opposition increased their fare on the 7th to one dollar and seventy-five cents, which remained with them for balance of the season ending on the 25th. The Troy line made landings at Albany, from July to the end of the season, on Sundays only, at same fare as first-class line.

On the day line the "Confidence," which last year was on the opposition, opened the season on the 30th of March in her former role, with the fare at one dollar and a half, and continued in uninterrupted possession of the route during the next month until the 17th, when the "Alida" joined her, making a daily line, the fare by the latter being two dollars, which continued during the remainder of the month. They were left in quiet possession of the day travel on the route until the 16th of May, when the "Hendrik Hudson" opened the season for the People's line, upon which the "Confidence" broke the rate of fare to one dollar, and on the 21st lowered again to twenty-five cents, and was continued during the balance of the month. The "Hendrik Hudson" opened at one dollar and a half, which was lowered in a few days to fifty cents, where it remained during the balance of the month of May. The "Alida" still continued the fare at two dollars. The "Confidence" evidently got tired of this game, for she was withdrawn on the 5th of June, when the fare was raised by the "Hendrik Hudson" to two dollars. On the 13th of this month the People's line placed on their route the "New World," which had just been completed, taking the place of the "Hendrik Hudson," and continued the same rate of fare as that held by the latter before her withdrawal. The "Alida," being on the opposite day, had the advantage of the same fare. On the 26th the "Cataline," belonging to the same parties as owned the "Confidence," and one of about the same size and power as the latter, was placed on the day route as an opposition, with the fare at fifty cents. At the opening of July the

"New World," and the "Alida" were running on opposite days, forming a daily line with the fare at two dollars, which prevailed during the whole month, while the "Cataline" was performing the same part as last month. There was no comparison to be made between the "New World," and the "Alida," which were of large size and high speed, and the "Cataline," which was very much smaller and of indifferent speed and accommodations, when compared to the two former boats. To show with what indifference they looked upon this opposition, it is but necessary to say that on the 4th of August the "Cataline" lowered the fare to twenty-five cents, while during the whole month the "New World" and the "Alida" were receiving two dollars. During September the rate was raised by the opposition to fifty cents, and the "Alida" being on the same day, fell in rate of fare to one dollar and a half, the "New World" holding to two dollars, which rates remained stationary during the balance of the month. October remained the same as the previous month, which finished the season for the opposition, when the "Alida" raised the fare again to two dollars, which continued till the end of the season on December 7th.

The steamboats owned by the People's Line Association were sold at auction, in the Merchants' Exchange, in New York City on December 26th, 1849, and were bought by a Mr. Dean at the following prices, viz:

"South America".....	\$29,000 00
"New Jersey".....	8,100 00
"Oregon"	36,000 00
"Columbia"	16,000 00
Half of each "Empire," "Troy" and	
"John Mason".....	40,000 00
"Rochester"	11,500 00
"Hendrik Hudson"	48,000 00
"Isaac Newton"	127,000 00
Barge "DeWitt Clinton"	240 00
Barge "Diamond"	125 00

The Association had prior to this been placed in hands of a receiver, a Mr. Eli Kelly, who had been in the company's employ as agent at Albany. At this time the trustees of the People's Line Association were Isaac Newton and Daniel

Drew, of New York, and Elijah Peck, of Flushing, N. Y. The trustees of the Troy and New York Steamboat Association at the same time were Jonas C. Heartt, John A. Griswold, and LeGrand B. Cannon, all of Troy, N. Y.

1850.

People's Line 1st Class 8 P. M.	People's Line Day Boats 7 A. M.	People's & Troy Line from Troy 6 P. M.
Isaac Newton	New World	Troy
H. Hudson	Alida	Empire
Oregon		
	Opposition 2d Class 8 P. M.	Opposition Day Boat 7 A. M.
	Rip Van Winkle	Armenia
	Manhattan	
	Buffalo	

This year the river opened for navigation on March 11th, The Mail line was not in operation this year. The Hudson River railroad having been completed this spring as far as Poughkeepsie, the People's line run two boats daily from Albany to Poughkeepsie in connection with the railroad, leaving Albany at 7 a. m., and 3.30 p. m., and returning in the afternoon, and later in the season at 11 a. m., and 3.30 p. m. The "South America" run the morning line until June, when the "Armenia" took her place till the latter part of October, when the "South America" was again put on and completed the season. The afternoon boat was the "Joseph Belknap" till November, when the Albany day line to New York finished the season. The fare from the opening of the season to June, by the morning line, was two dollars, and from June to August 20th one dollar and a half, and from the latter date to the close of the season, two dollars. The fare by the afternoon boat was one dollar and a half during the entire season.

This year the People's line run but one line of night boats, which were composed of the larger boats, "Isaac Newton" and "Hendrik Hudson," and a portion of the time the "Oregon." As soon as the season opened the opposition put in an appearance as usual with the "Rip Van Winkle," and the "Buffalo," and on the 19th of March the "Manhattan" tried her

fortune once more on the route, in opposition to the People's line. The rate of fare varied during this month on the opposition lines, from twenty-five cents to one dollar and a half, while the People's line rates of fare were fifty cents, and on alternate nights, one dollar and a half. The Troy line only made a landing this year at Albany on Sunday nights on the down trip, and their fare was uniform most all of the season at one dollar and a half. In April the "Rip Van Winkle" was run with the "Manhattan" on alternate nights, and the "Buffalo" was run as an opposition, making three landings, while the other boats run through without landing. The People's line this month continued the rates of the previous month till the 22d, when they cut the rates to fifty cents, and seventy-five cents on alternate nights, while the "Rip Van Winkle," and the "Manhattan" sought for travel at twenty-five cents, and one dollar and a quarter on alternate nights till the 22d, when they cut rates to twenty-five cents and fifty cents for the balance of the month. The "Buffalo" opened the month at twelve and one-half cents, but shortly after raised to twenty-five cents, which was the rate with her to the close of the month. For the first twenty days in May the People's line held the rates at one dollar and a quarter, while the opposition was steady at one dollar. The "Buffalo," on the 4th, broke her engine very badly, so as to make it necessary for her withdrawal. She was not on the route again during the season but for a few days, her place being taken during the summer by other boats. After the 10th of the month the opposition lowered the fare to fifty cents again, which was the usual rate with them during the balance of the month. In the latter part of the month the "North America" also tried a few trips on the opposition, as also did the "Connecticut." After the 20th, the People's line cut the rates to fifty cents, and one dollar and a quarter on alternate nights, during the remainder of the month. For June there was about the same condition of affairs existing generally, as during the previous month, except that one of the opposition lines, during a majority of days in the month, kept the fare at twelve and one-half cents, while the other opposition run for twenty-five cents. Immediately after the opening of July better rates prevailed, so that by the 10th the People's line were receiving one dollar

and a half, while the "Rip Van Winkle" and the "Manhattan" were running for one dollar, and on the 15th raised to one dollar and a quarter, which rates held until the beginning of August. On the 3d of July the opposition line making landings withdrew, and the "Rip Van Winkle" and the "Manhattan" were left during the balance of the season with all the opposition in their own hands. During August and September the two night lines were at peace, so far as rates were concerned, but during October the People's line were receiving one dollar and a half, while the opposition held the fare at one dollar. During November the People's line kept the same fare as in October, while the opposition raised to one dollar and a quarter. These rates continued in force till the close of navigation on December 17th.

There were no day-line boats from New York to Albany this year, until the "New World" opened the season on May 6th, and the "Alida" followed on the 22d of the same month, with the fare at two dollars. June was a repetition of May, except for three days when the "Armenia" entered as an opposition, when rates were cut by both lines on the same day to one dollar. On the 13th of June the "Armenia" was placed on the Railroad line to Poughkeepsie, by the People's line, which broke up all opposition to the day line for the remainder of the season. The "New World," and the "Alida" run until the latter part of October, when the "Armenia" was taken off the Railroad line, and with the "Alida" completed the season of the day line, in the place of the "New World," which ended November 25th of this year.

1851.

People's Line 1st Class 8 P. M.	People's & Troy Line from Troy 7.30 P. M.	People's Line Day Boats 7 A. M.
Isaac Newton	Troy	South America
H. Hudson	Empire	New World
Oregon		Reindeer
Independent Line Day Boats 7 A. M.		Opposition 7 P. M.
Alida		Manhattan
Henry Clay		Rip Van Winkle
		Buffalo

The ice broke up in the river this winter to allow the boats to run on the 25th of February. The People's line at once opened their night line with the "Oregon" and the "Hendrik Hudson," with the fare at one dollar and a half, and on the 26th the "Buffalo" started the season's opposition at the low rate of fifty cents. On March the 2d, the "Manhattan" joined the "Buffalo," the two forming a daily opposition line, and they immediately began their work of cutting the rates of fare, in this instance to twenty-five cents, and fifty cents on alternate nights, which they held up until the 16th of the month, when the rates were raised to one dollar, which remained constant with them till April. The People's line held their rates very steady at one dollar, and one dollar and a half during the first half of March, after which time one dollar and a quarter, and one dollar and a half were charged till the close of the month. On the 4th of March the "Armenia" was again placed on the Railroad line, between Albany and Poughkeepsie, at 1 p. m., with the fare at two dollars, where she remained until the Hudson River railroad was opened between Albany and Hudson on June 14th, when she was placed on the route between Poughkeepsie and Hudson, to fill the gap on the unfinished portion of the railroad, when the line from Albany to Poughkeepsie was discontinued. The Troy line commenced running on March 14th, landing at Albany only on Sunday nights, which was continued all the season. The first half of April the same state of affairs existed between the Albany lines, as were prevailing during the last half of March, but on the 16th they once more cut into the rates, the opposition falling off to fifty cents, while the People's line fell to fifty cents, and one dollar on alternate nights, which they both continued during the balance of the month. On the 22d of March the "Rip Van Winkle" took the place of the "Buffalo," she having been lengthened, refurnished, and refitted during the previous winter, so that she was a much finer boat than originally. The "Buffalo" was again placed on the route to run at a lower fare than the other opposition, which she continued for a little over a month at twelve and one-half cents, and a portion of the time at twenty-five cents, when she was withdrawn. May showed very slight changes in rates of fare from the latter part of the month of April, on the People's

line, while the "Rip Van Winkle" and the "Manhattan" held to their rates of the previous month, except a few days, when fare at twenty-five cents prevailed with them. The first twenty days of June the opposition was on the "bear" side of the market, with the low fare of twenty-five cents very steady during that period, but after that they raised the fare to one dollar, which rate they retained till July. The People's line kept on the even tenor of their way, and maintained their rates till the 20th, when they raised to one dollar and a quarter, and held at that figure the balance of the month. The next month presented no changes of moment, either in the boats on the route, or the rates of fare, which remained as they were during the latter part of the previous month. August, September, and October, until the 13th of the latter month, was without any change, on which date the "war of rates" again commenced, and this time at fifty cents, by both lines every night, and was kept up steady until the close of the season on December 11th. This would appear to have been one of the most determined of all the "wars" up to this time, at this rate of fare without any change, and for such a length of time. It existed for two months lacking two days, and was only then brought to a close by the heavy ice in the river, compelling them to cease their rivalry, or there is no telling how much longer it might have continued. The boats always ran as long as they were able to get through the ice to Albany, and when that was impossible would land at the nearest point to the railroad, and send their passengers on by rail.

The day lines opened for travel on April 9th with the "South America," and on the 15th the "Reindeer," which was then a new vessel, and has always been considered one of the high-speed boats of the river in her day, was placed on opposite days to the "South America." The "Reindeer" was originally built for the New York and New Brunswick, N. J., route, by the New Brunswick Steamboat Co., whose principal stockholders were James Bishop, E. J. Jacques, and J. A. Williamson. The vessel was completed in August, 1850, and made but one or two trips to the Raritan River. In September she was running as a day boat from New York to New Haven, Conn., in opposition to the New York and New Haven R. R., leaving New York at 8 a. m., and leaving New Haven

the same day at 1.30 p. m., with passenger fare, seventy-five cents. This continued for two or three months. The lines of the hull of this vessel were those well adapted for high speed, and it would seem as though the vessel should have gone well in either direction. During this summer the owners of the "Reindeer" purchased the "Alida."

The fare during the month of April was one dollar and a half by the "Reindeer," while by the "South America" two dollars was demanded. An agreement was made between the People's line and the owners of the "Reindeer," as to the rates of fare on their day-line boats. During the month of May there was no change, except the "New World" took the place of the "South America" on the 15th, and on the 28th of the month the fare was raised to two dollars, and those figures prevailed until the 18th of June, when it was lowered on both boats to one dollar and a half, and was kept steady at that figure until July. On July 2d another new boat made its appearance on the river on the day route: this was the "Henry Clay," as an opposition boat, with fare lowered to fifty cents, and being on the same day with the "New World," compelled the People's line to meet the cut rate of the opposition. The "Henry Clay" was withdrawn on the 25th, after which date the former rates of fare prevailed from this time until the 17th of October, when they were lowered to one dollar, and remained there during the balance of the season, which ended on November 11th for the day boats. The "New World" and the "Reindeer" formed the line until September 25th, when the "Henry Clay" and the "Alida" took their places until October 18th, when the "Thomas E. Hulse" finished the season with the "Henry Clay."

1852.

People's Line
1st Class
8 P. M.
H. Hudson
Isaac Newton

Troy Line
7 P. M.
Troy
Empire

People's Line
2d Class
7 P. M.
Rip Van Winkle
Oregon
New World

Opposition 2d Class 7 P. M.	Regular Line Day Boats 7 A. M.	Opposition Day Boats 7 A. M.
Manhattan	Reindeer	Francis Skiddy
Francis Skiddy	Alida	Henry Clay Armenia

The first boat through to Albany this season was the "Nimrod," that had been on the New York and Bridgeport route, and arrived at Albany on March 28th, but did not run there again during the season. The opening of navigation found the "Manhattan" once more on hand as the opposition, but her consort in previous years, the "Rip Van Winkle," was now under the protecting wing of the People's line and ready to compete with her former ally for the travel of the river. The fare by each of the lines was fifty cents, both first and second class, which figure was retained during the month of April. The Troy line during this season did not make any landings at Albany. The conditions of the lines were the same during May, except the "Manhattan" cut the rate to twenty-five cents for a few trips, but soon restored it to the former prices. In June the People's line held their own previous rate, while the opposition cut for the whole month to twenty-five cents, and was joined for two weeks by the "Santa Claus" in the cut. For July the first-class boats of the People's line held to the fare at fifty cents, but the second class kept company with the opposition, on the low fare of twenty-five cents for considerable time during the month, after which there was the usual raise. During August, September and October a better feeling existed between all the lines. There were no further moves made for knocking down the rates, and the season closed December 23d with the fare at fifty cents. On October 13th the "Francis Skiddy" run on the opposition night line till the close of the season, having previous to this been on the day route since her first trip in the spring of the year. The "New World" was in the place of the "Rip Van Winkle" after October 21st, put on in direct opposition to the "Francis Skiddy," as the "Rip Van Winkle" was no match for the "Francis Skiddy," and continued on the 7. p. m. line till the close of navigation.

This was a lively year on the day line, as there were dur-

ing this season four steamboats on the route, which have records of fast time and speed given them between New York and Albany, namely, the "Alida," the "Reindeer," the "Francis Skiddy," and the "Armenia." The "Henry Clay" was one above the average, and forced the abler ones to keep awake to maintain their reputation for speed, although she was not able to cope with them under all circumstances. It is not to be inferred from this that these were the only steamboats of high speed that had been on the river; but there had not been a year when so many had been together on the day line, and all of them comparatively new boats. The "Alida" was about five years old, the "Reindeer" two years old, the "Armenia" four years old, and the "Francis Skiddy" just completed during the spring of the year. It must be remembered there was the "New World," which was able to hold her own with the best of those previously named, but she was on the night line this year. There was also the "South America," but she was now about twelve years old. All of those named, as well as the "New World," were capable at this time, when circumstances were favorable, to make the trip between New York and Albany within eight hours, and make all the landings. The conditions should be sufficient depth of water in the river above Hudson, leaving New York on the last of the flood tide, and having but little or no head wind. The fast trip of the "South America," of 1844, was made with the wind blowing a gale from the southeast. There have been a few trips made by different boats, one of them by the "South America," of under eight hours from Albany to New York, when the river has been swollen by a freshet.

The consumption of fuel of some of these fast day boats during their trips of about 9 hours was: "South America," 25 to 28 tons; "Armenia," 15 tons; "Francis Skiddy," 28 to 32 tons; "New World," 38 to 40 tons; "Reindeer," 18 to 20 tons; "Alida," 20 tons. All anthracite coal. When they were racing the increase of fuel would be about 30 per cent. greater than the above figures.

The season for the day boats did not open this year until May 1st, when the "Reindeer" opened the season, followed by the "Alida." The "Armenia," as an opposition, commenced running on the same day as the "Reindeer," and the "Henry

Clay" followed on the 7th of the month. The rate of fare was by the regular line, fifty cents; that was maintained until the 22d, while the opposition led off at twenty-five cents, but toward the close of the month thought better of such ruinous prices and withdrew until the 15th of June, when they came upon the scene of activity again. They had no trusts in those days, but some combinations they formed did not last over night.

After the 22d of May the regular line raised the fare on account of no opposition to one dollar, but when the "Henry Clay" and the "Armenia" were back again, then the fare fell once more to fifty cents. On the 21st of June, the "Francis Skiddy" made her first trip and entered with the "Henry Clay" on opposite days in competition with the regular line. The "Francis Skiddy's" hull was built in 1848-49, by George Collyer, with the purpose of placing in her a Rotary engine of large dimensions, but this plan was abandoned and the hull laid up at Cold Spring, N. Y., for about a year, when it was bought by James McCullough, of New York, and fitted with a beam-engine by Joseph Belknap. The hull was launched under the name of "General Taylor." A better rate of fare existed during July, the prevailing fare being one dollar.

The "Francis Skiddy" and the "Alida" maintained a lively opposition this season, as they were running on the same day from New York and from Albany most of the time, and so fierce became the contest that it was almost a daily occurrence for them to meet at some of the landings, and then how the splinters flew! The owners of the "Skiddy" announced that "this boat will leave at 7 o'clock, unless the opposition boat leaves before, in which case the "Skiddy" will leave at the same time she does, but under no circumstance will any of the landings be passed."

On Wednesday, July 28th, the "Henry Clay," while on a trip down the river, and when a short distance below Yonkers, caught fire and was burned to the water's edge. The vessel was run ashore about two miles below Yonkers dock, in the vicinity of Forest's Castle, or Riverdale. It was one of those accidents on the water which seem to electrify the community and cause them to ask, if there is any safety from such appalling disasters. The "Henry Clay" started from Albany on this



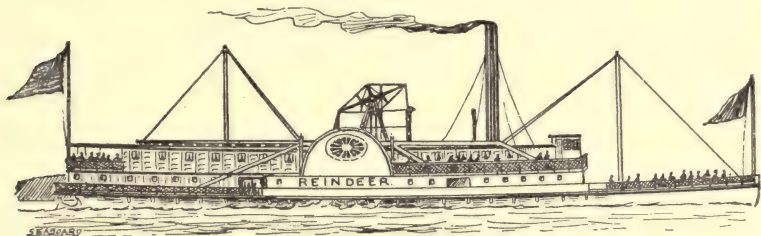
“FRANCIS SKIDDY” AS DAY BOAT.

day, at the same hour as the "Armenia," and it was soon evident that a strong endeavor was to be made to get and maintain the lead of the other boat, each of the boats, in turn, passing landings where the other had stopped. At length, in a narrow channel in the river near Rhinebeck, the boats came in contact, not in such a manner as to do any serious damage, but sufficient to excite alarm among the passengers of both vessels. The effect of the collision was to cause the "Armenia" to drop astern, and the "Henry Clay" then took and maintained the lead, increasing the distance between them up to the time of the breaking out of the fire at 3.15 p. m. It is supposed that just previous to the fire, the blower having been put in operation for increasing the draft of the furnaces, and that the furnace doors not being securely fastened, the strong blast from the blower had forced open the furnace doors and drove the flames from the furnaces against the wood-work in the vicinity of the boiler, that was in the hold of the vessel, which took fire immediately and burned with alarming rapidity. The vessel was run ashore head on, but the larger number of passengers being aft of the engine and boiler were obliged to take to the water, which was here very deep almost to the shore, though a number remained on board the vessel until actually forced by the fire to take to the water. It is believed that over one hundred lives were lost by this lamentable occurrence; should not be called an accident.

The "Francis Skiddy," after the burning of the "Henry Clay," was alone on the opposition day line most of the time till the 18th of September, when her place was taken by the "George Washington," a much smaller and by no means as able a boat, until the 5th of October. During August, as the "Skiddy" was the only opposition, there was a cutting of rates on them days to fifty cents, while on alternate days one dollar was charged.

On September 3d the "Reindeer," while on a trip up the river, and lying at the dock at Bristol about 1 p. m., met with a very serious accident by the bursting of one of the connections of one of her boilers, resulting in the loss of many lives, estimated at the time to be about thirty, besides a number very badly scalded. The boilers of this steamboat were in the hold, and most of those either killed or scalded were at

the time in the dining saloon that was just aft of the boiler-room. Immediately after the accident the vessel caught fire and was cut loose from the pier and permitted to run ashore on the flats just above the scene of the accident, where she burned to the water edge, and what remained sunk on the flats. What was of service of the machinery was afterwards used in the steamship "Perseverance," built for the Morgan line, of New Orleans, La.



"REINDEER"—DAY BOAT.

After the accident to the "Reindeer," the "Alida," that had been sold to Daniel Drew, and the "Francis Skiddy" kept the fare at one dollar, which was held by all interested till the close of the season. There were several days during this period, although not for any extended time, when the rivalry was so sharp that the runners sold tickets on the piers as low as twelve and one-half cents for a through passage between New York and Albany.

Several accidents happened this year to the day boats. On May 6th the "Reindeer" burst her steampipe, slightly scalding two passengers. On the night of May 23d the "Henry Clay," which had left New York the same afternoon to be in Albany the next morning to change her day, so as to be in opposition to the "Alida," having previously been on the same day with the "Reindeer," broke her shaft, which compelled her to withdraw for a few weeks. On July 2d the "Alida" broke her shaft also, which made it necessary for her to be off the scene of activity for two weeks. There was also the destruction of the "Henry Clay," on July 28th, as well as the burning of the "Reindeer" on September 3d, both previously mentioned.

1853.

People's Line 1st Class 7 P. M.	Troy Line 6 P. M.	Merchants' Line Opposition 7 P. M.
H. Hudson	Empire	Francis Skiddy
Isaac Newton	Oregon	Manhattan
	Rip Van Winkle	
Day Line 7 A. M.		Opposition Day Line 7 A. M.
G. Washington		Francis Skiddy
Oregon		
New World		
Armenia		

The opening of navigation this year on the Hudson River was on the 23d of March. The "Hendrik Hudson" and the "Isaac Newton" were at once placed on the route by the People's line, and at the same time the "Francis Skiddy" opened on the opposition line for the season. The fare was placed at fifty cents by both lines, which lasted through the month. The "Manhattan" joined the opposition on the 10th of April, thus forming a daily opposition line. The two lines run under the foregoing condition during the remainder of the month, through the month of May and during June until the 29th, when the "Francis Skiddy" commenced leaving New York every morning, and Albany every evening, thus making a round trip inside of 24 hours as the opposition. This extraordinary performance was continued during July and up to August 15th, a period of seven weeks, when she was placed on the day line, solely for a few weeks, when she was withdrawn and once more run as a night boat with the "Manhattan" until the 24th of October, when she was sold, and subsequently run in the Erie R. R. line and in the Troy line. Otherwise, the night lines run without any change of importance during the balance of the season, which ended December 20th.

The "Francis Skiddy" seems to have had an eventful career. After running two seasons, her original owner lost the controlling interest in the vessel, J. E. Andrews and Geo. W. Coster each having a two-twentieths interest, and the Erie R. R. Co. a five-twentieths interest, in May, 1852. Shortly af-

ter Cornelius Vanderbilt obtains the majority interest, and in a few months Eli Kelly and Daniel Drew, both directors in the People's line, have the sixteen-twentieths interest of the vessel, after which the New Jersey Steam Navigation Co. take the vessel and she is run in the Erie R. R. line, and after that in the Troy line. At the time the vessel was taken in the Erie line, Daniel Drew was a power in the Company. At the same time he was in the combination, through his control of the People's line, of the through route between New York and Buffalo, N. Y., in connection with the system of railroads then running between Albany and Buffalo, at a lower rate than could be met by the Erie R. R. Co., in which he was interested and represented by others in the Board of Directors. Homer Ramsdell was about this time President of the Company.

There were three of the day-line steamboats of this period that were built as outside speculations by their owners, with the result that the "lambs" laid down inside of the king of the forest. The regulars managed to gather them in when wanted, or when they showed too factious an opposition.

The day lines did not commence running this year until May 18th, when the "George Washington," a very inferior type of vessel for the route, opened the season and continued to serve the day line alone until the 6th of June, when the "New World" was added and continued until the latter part of the month, when she was withdrawn for repairs to one of her water wheels. On July 1st, while lying at her wharf in New York and but a few minutes prior to the time for starting on her passage to Albany, four of the main flues to the outside furnace of the port boiler collapsed at the same instant, resulting in the loss of eight lives, all of them firemen and other hands belonging to the boat. The "Skiddy" had begun to run a few days previous to this disaster on the "New World" a round trip from New York in twenty-four hours, and it was talked around a day or so prior to 1st of July that the "New World" and the "Francis Skiddy" were to have a trial of speed on that day. On the coroner's inquest held a day or so after the disaster, some of the officers and several of the hands employed on the vessel testified that the night before a very heavy thunderstorm passed over the city and during its passage there was a very heavy crash heard, and what

they supposed must have been a bolt of lightning that passed down the smoke-pipe into the boiler and had done some damage. This part of the question was settled in their own way by the steamboat inspectors in their examination. The following is the report, in part, of the steamboat inspectors, and was the first investigation and report made by the New York inspectors under the law of 1852. At this time they made their report to the Collector of the Port, but about 1855 the law was amended.

New York, August 9th, 1853.

Hon Greene C. Bronson, Collector.

SIR:—In relation to the explosion of the steamer "New World" we have the honor to report that Mr. Washington Hawes, the Chief Engineer of that boat, having sufficiently recovered from his injuries to enable us to take his testimony at his own house, we proceeded to Fort Lee and there obtained it. His testimony in the case completes the evidence. On the morning of the explosion the "New World" was visited by Mr. C. W. Copeland, Supervising Inspector, and by Mr. Renwick, who carefully examined the state of the steam gauges and safety valves. On the Saturday following the same parties in company with Mr. Weeks and Messrs. W. H. Ellett, D. G. Wells, and W. H. Draper, again visited the vessel. The boilers of the said boat had not been inspected as required by law, approved Aug. 30th, 1852, but the owners had applied for such inspection and the boat would have been inspected in her proper order. The local inspectors would here remark that about ninety vessels have applied for such inspection, which requires for its careful performance from one half a day to a day, and when defects are discovered at least two days; 58 vessels have been inspected up to the present time, and the inspectors are proceeding with the remainder as speedily as possible. The engineers and pilots of the "New World" have been duly examined and licensed."

Then follows the result of their examination of the boilers and their fittings of the vessel, and the testimony of the witnesses, with their findings. The opinion of the board of local inspectors was that the boiler gave out from an excessive pressure of steam and that there was not what is commonly known as an explosion, and that this excessive pressure was

due to the derangement of the syphon steam gauges and the safety valves. They suspended the chief engineer "from duty for the unexpired term of his present license, and revoking that license." The board further said, "The board have not been able to discover that there was any deliberate intention of racing with the 'Francis Skiddy,' one witness only swearing that the firemen were conversing about racing with the 'Francis Skiddy.'" They also found that the boat was not struck with lightning, or if struck, the boilers were not injured thereby." John N. Weeks and Henry B. Renwick were the local inspectors of steamboats at New York at this time.

This instance of carrying an excessive pressure of steam was not an isolated case, and it is more than probable would never have been generally known or particular attention called to it but for the fatal consequences attending it. Nor was the chief engineer doing more than most of his brothers of the starting bar were doing every day, only he was unfortunate in meeting with the accident, and in taking such risks they took the chances of the law's severity.

The agent of the "Francis Skiddy" at this time obtained a little free advertisement for the vessel: "I perceive in most of the notices of the accident on board the "New World" that the "Francis Skiddy" is named in such a manner as to make it appear she was in some way concerned in that deplorable affair. Why this should be I cannot conceive, as the "Francis Skiddy" does not race with any boat, but leaves her wharf in New York every morning at 7 o'clock and every evening at the same hour from Albany. This arrangement does not require quick time, but regularity. It is well known by all the steamboat judges that the "Francis Skiddy" can make the time in less than seven hours, while in the present arrangement she is not allowed to go or return in less than eight or nine hours, thus leaving her three or four hours of spare time in each place. The agent cannot allow anything like racing or making quicker time than this. When the "Skiddy" makes a race the public shall have at least ten days' notice."

That would have been a battle of the giants of the river but for the accident. The "New World," with her forty-five feet water wheels and fifteen feet stroke of piston, and

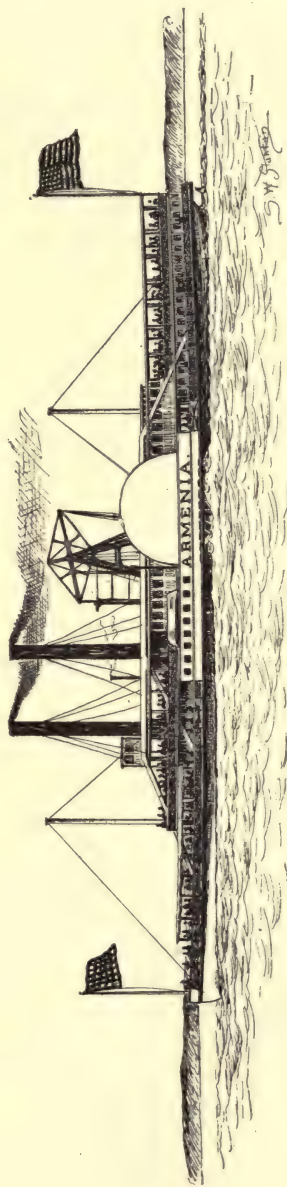
the "Francis Skiddy," with forty feet water wheels and fourteen feet stroke of piston, would have made a sight worth witnessing in their struggle for the head of the line. The chief engineers of the respective vessels were comparatively young men, who were fully capable of caring for the interests in their charge.

The "Empire," of the Troy line, was sunk on the morning of July 16th, 1853, while on a trip to New York, and in the vicinity of New Hamburg. The vessel was run into by the sloop "Gen. Livingston," whose bowsprit penetrated the port boiler and broke the steam connections that caused the death of eight persons and the injury of fourteen others. The upper works and hull of the vessel were so largely damaged that the vessel sank in a short time. The vessel was raised, brought to New York and dismantled. This was the last of a noted vessel at the time, but at times unfortunate Hudson River steamboat.

The "New World's" place was filled temporarily after the accident by the "Oregon" until the "Francis Skiddy" was put on in August. In September the "Armenia" took the "Francis Skiddy's" place, and when the "George Washington" was withdrawn, on October 1st, continued the line alone, making a trip from New York every other day until the 30th of the month, when the day line ceased their operations for the season. The "Armenia" continued to run under the same owners on the day route until 1863.

In November, 1855, the "Alida" was purchased by Alfred Van Santvoord, and during the season of 1856 was run on opposite days to the "Armenia," and at the end of the season was withdrawn from the passenger service. She was in the towboat fleet of her owner, with the exception of one year, until sold about 1865, to the Austin Company, and was finally laid up at Port Ewen, in 1875, as having served her day on the river.

The season of 1856 may be said to have been the last year when there was any opposition of moment on the day route. The "Armenia" opened the service this year and ran alone for two or three months, when in July the "Glen Cove" entered as an opposition boat, and immediately the "Alida" was brought out to run with the "Armenia" on opposite days.



"ARMENIA"—AFTER 1853.

Then began a period of excitement on the river again, and through passenger fare dropped as low as 50c. for some time; never above \$1.00. To draw passenger travel the owner of the "Glen Cove," in August, had a steam calliope, that was a new musical instrument at the time, placed on board the vessel. On her first trip up the river with the calliope numbers of residents for two or three miles on either shore of the river came down to the water to ascertain where the floating music box came from, so great was the curiosity to learn the source of the loud musical notes that were heard so far from the river. It was employed as an advertisement during a period of sharp competition, and it proved a drawing card by its novelty, for the daily passenger list was almost double what it was before its installation. The "Glen Cove" ended her season in October of that year, with charity and good feeling among all those interested in the day service. In the following March the vessel was sold to parties in Virginia, who took her to Richmond in May for service on the James River. She was on the river when the War of the Rebellion broke out, but was burned during one of the periods when it was thought the city of Richmond was to be evacuated, where she was lying. The calliope was still on her when leaving for the South.

The year 1853 was the commencement of a new era in steamboating on the Hudson, as well as on all navigable rivers of the United States, for in the fall of 1852 preparations were made to put in force the law regarding the inspection of steam vessels and the licensing of some of the officers of the vessels, passed by Congress August 30th, 1852, but it was not until early in 1853 that the practical work was commenced. Previous to the passage of this law the inspection of steam vessels was a howling farce. There is no doubt but that the enforcement of the later law had a great tendency to curb that fierce rivalry that had existed for so many years on the rivers of the United States, and in fact almost from the very opening of steam navigation, and in consequence of which in a number of cases accidents, so called, have taken place, resulting many times in the loss of life. When engineers would carry steam on their boilers until at every opening of the steam valves the heads of the

steam chimneys of the boilers would rise and fall, or "pant," so as to be plainly perceptible to the eye; or would increase the pressure of steam to such a degree, when in competition with another boat, that the mercury in the pressure gauge would be blown out from the increased pressure over what the gauge was intended to register, and then plug up the mouth of the tube and get all the steam they were able by forced firing, and not know what pressure they were running under, for the safety valve would be manipulated also, and thus jeopardize the life of every passenger on the vessel by such risk, or recklessness more properly termed, as well as their own lives; it is not singular after such liberty being used without any intervention of law, that they should murmur; but it is more remarkable that there had been no law passed that would have been effectual to prevent such recklessness before that of 1852 was placed on the statute books.

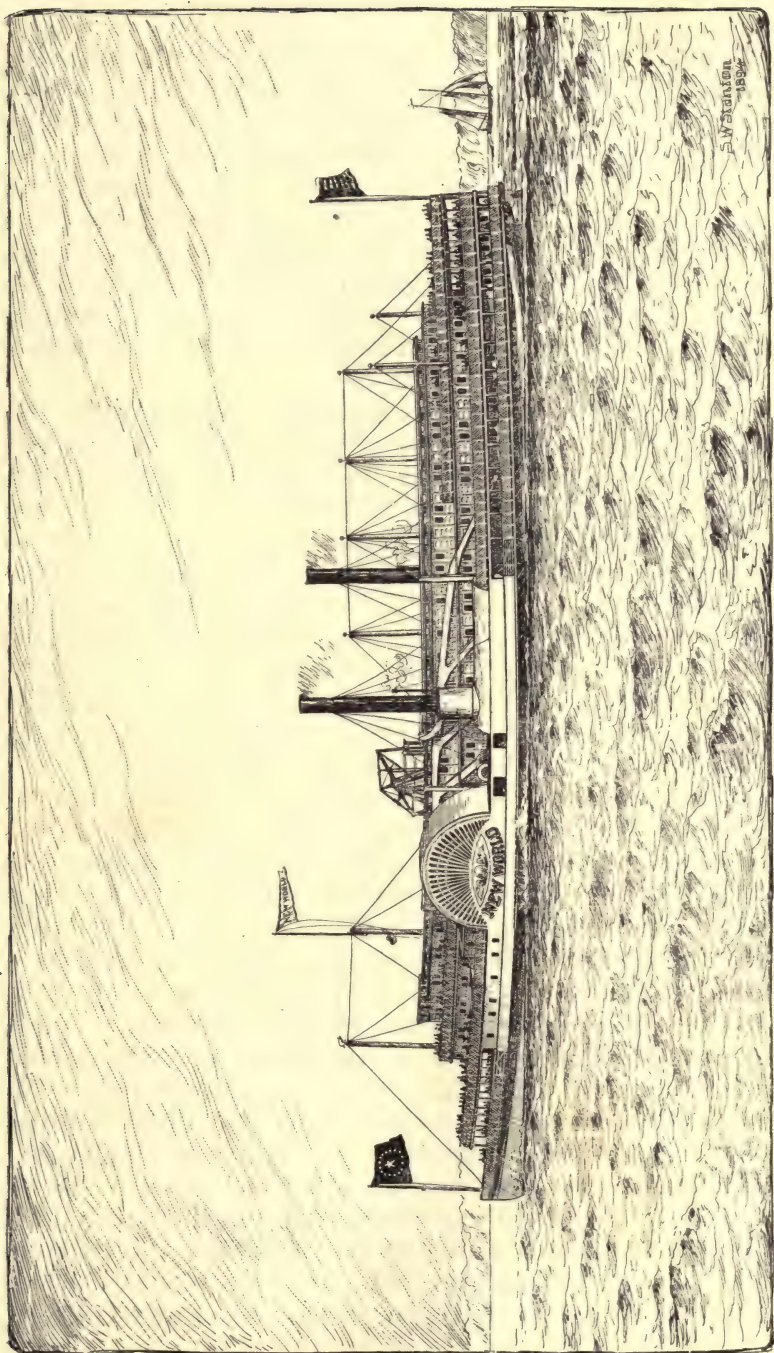
There are the older engineers who tell us that they have carried steam on the boilers of the river boats and so performed with their engines while they were young men, that in the light of their later experience they consider it now the extreme of recklessness.

This applies not more to the Hudson River than to any of the other navigable rivers of the United States, but it was probably more noticeable there than elsewhere along the Atlantic coast on account of the large number of steamboats in service. The risks of the captains and pilots in the navigation of their vessels must also be considered, for they hesitated not in taking any advantage that offered itself to make a point on a rival, even to crowding a rival vessel on a flat or shoal in the river when it was possible to do so. It is not to be inferred from this that the officers of steam vessels prior to 1853 were inhuman and seeking while in prosecution of their calling the lives of the passengers who were intrusted to their care. They had become so familiar, speaking generally, with taking risks beyond the limit of safety that they thought lightly of it. It was a part of their early education in their business and looked upon as a right to exercise at their discretion.

An engineer thus relates an incident in his experience

previous to 1850. He was at one time engineer on a passenger boat named the "Proprietor," which run for a time in New York harbor and subsequently on the Delaware River. While running on the latter river, they had been on a trip down the river with an excursion and were returning home when they met a steamboat of about the same size and known to be about the same speed as their own. When the two vessels came near to each other the captain of the "Proprietor" asked the engineer if he thought he was able to pass the other boat. The engineer thought he was. So they prepared for the contest by tying down the safety valve lever and drawing the pointer from the mercury gauge and plugging up the mouth of the tube, and urging the fire on the two small boilers. By degrees the "Proprietor" passed her rival by carrying high steam, but at what pressure it was not known, although its effects were seen on the boilers afterwards, for in the furnaces there were bulges in the plates between the braces as large as tea plates, showing that there had been an excessive pressure of steam. He had very often carried as high as 50 or 60 pounds of steam, but a number of severe explosions shortly after this race had the effect to tame his desire for high steam (at that time), and he never carried afterwards more than 30 pounds.

In 1854 the People's Line Association was incorporated under the laws of the State of New Jersey as the New Jersey Steamboat Company, with a capital stock of \$500,000, that was subsequently increased to \$2,000,000. Isaac Newton was the first president of the company and Daniel Drew was treasurer. The latter succeeded to the office of president upon the death of Isaac Newton in 1859, which office he held until 1878. Under the new organization the boats discontinued making any landings along the river, as some of the lines under their control had frequently done, and from that date have run only through lines without any intermediate landings. Another factor that was beginning to have a very marked effect was the increasing travel by the Hudson River Railroad. The completion of this railroad and the steamboat law of 1852 were the agents that made the radical change in steamboating on the river at this period. At this time, in 1855, the "New World" had been widened in



"NEW WORLD."—NIGHT LINE.

the hull from 36 feet to 47 feet at extreme width, and state-rooms added for a night boat exclusively. At the same time as this was done the "Knickerbocker," then running on Long Island Sound, was widened 3 feet in the widest part forward of the water wheels, that were left in a recess made by the increased width. A number of the older and smaller boats of the People's line had been sold prior to the reorganization, which left the "Isaac Newton," the "New World," and the "Hendrick Hudson." The boats continued in the service of the company until after 1863 as night boats, when new vessels were built for the line.

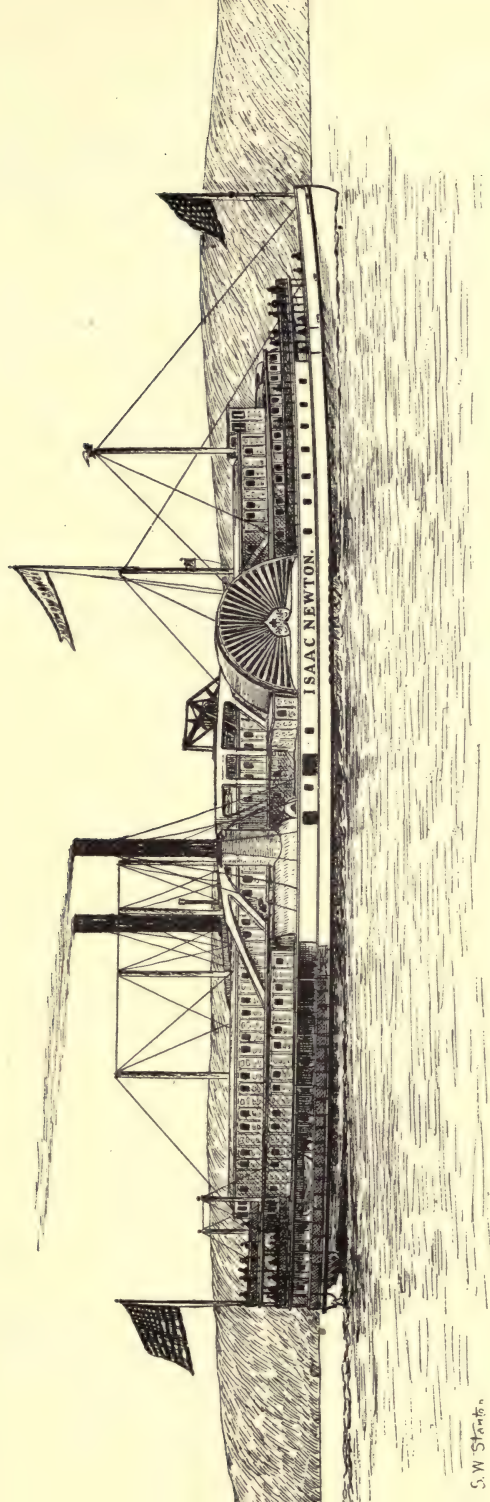
The "New World" was unfortunate again in 1859. On October 26th of that year, while on her trip to Albany and when about opposite to Fort Washington, her engine came down in a mass, resulting in the sinking of the vessel. The pilot rang the bell for the engineer on watch to stop the engine, as there was a schooner crossing his course, and the engineer being at the time in one of the firerooms across the gangway from the engine room, immediately responded to the call of the bells and "unhooked" the engine, which action was followed by the breaking off of the gallows frame about five feet from the top; that caused the falling of the working beam and the snapping off of the connecting rod about two feet from the upper end, that fell of its own weight, being aided by the revolution of the crank, through the saloon deck and main deck to the bottom of the vessel, and cutting a hole that in a period of half an hour filled the vessel with water to a depth of five feet. The working beam did not fall further than the hurricane deck. The passengers were taken off by a sloop and the steamboat "Ohio," both of which were in the immediate vicinity at the time. It was afterwards found that the gallows frame was quite rotten, and the wonder was it did not give way long before. The shock produced by the falling of the connecting rod and the working beam was so great, that many of the passengers at the moment thought that the vessel had struck a rock in the river. The vessel was subsequently raised and repaired. The hull was used as a hospital ship on the James River after the engine was removed in 1864. In 1862 a Sickels steam-steering apparatus was fitted in the pilot house of this vessel,

consisting of two cylinders 9"x10", and connected to the drum of the steering wheel. It performed its duty satisfactorily, but the heat from the steam cylinders being in the pilot house was objectionable. This engine was the next year placed on the U. S. steam frigate "Roanoke," that had just been razed.

In 1855 a new Troy night line was established by the New Jersey Steam Navigation Company, that was the corporate name for the Stonington line on Long Island Sound, which company was largely controlled by the New Jersey Steamboat Company, or the People's line, Daniel Drew being at the time the moving spirit of both organizations. In March, 1856, they placed the "C. Vanderbilt," belonging to the New Jersey Steam Navigation Company, and the "Francis Skiddy," on the route. The company owned the former vessel entire, and through Daniel Drew they acquired 16/20 of the latter. After the opening of the line the "Francis Skiddy" was more completely altered for a night boat by additional staterooms, and later by the building of an additional hull on the outside of the original hull, framed the same as they would build a steamboat, and fastened to the bottom of the old vessel, the greatest width between the two hulls being six feet amidships. The contract for this change was \$12,000. The vessel originally when loaded with freight was found to draw too much water to go to Troy, and it was necessary to make some change in the vessel to fit her for use on a night line to Troy. This change decreased her draft of water about two feet. These two steamboats ran on the Troy line until November 25th, 1864. This line was sold to the New Jersey Steamboat Company in September, 1864, the vessels to be delivered at the close of navigation, but the "Skiddy" was sunk on her last trip prior to her proposed delivery. The vessel was on her way to New York, on November 25th, 1864, and when about four miles below Albany, near Staat's landing, she ran foul of a rock, those in interest stated, tearing a hole 16 feet long and three planks wide, began to fill at once in the outer hull and careen from the weight of water on one side, but was beached in such short order that there was little damage from that quarter. The vessel was stripped of much of her fittings; the main engine and auxiliaries were used

in the building of the "Dean Richmond" for the People's line. The object of the sale was evidently for the purpose of their withdrawal from the route, for the largest stockholders in the People's line were also largely interested in the Troy line. The Rennselaer and Saratoga R. R. Company now run their trains to Albany, and the People's line desired to have the control of the travel in that direction. The price paid for these boats by the People's line was \$200,000—in stock of the company, divided pro rata with the stockholders of the New Jersey Steam Navigation Company. This was for the "C. Vanderbilt" and 8/10 of the "Francis Skiddy." The other 2/10 interest in the latter vessel, held by John E. Andrew and George W. Coster, both of New York, refused to accept such disposition of their interest, and brought suit against the People's line for damages for the sum of sixty thousand dollars, and after dragging along in the courts from November, 1865, to March, 1879, they were rewarded with a verdict against the People's line of full amount claimed with interest. It was in this suit that the close connection existing between the two prominent steamboat companies was brought to light. The New Jersey Steam Navigation Company was incorporated in 1839 by a special act of the New Jersey legislature, and they bought out the old Stonington line, or Boston and New York Transportation Company, Daniel Drew and Commodore Vanderbilt being largely interested. They built the "C. Vanderbilt," "Commodore," "Plymouth Rock," and afterwards added the "Commonwealth." This company closed out their interests in the "Plymouth Rock," the "Commonwealth" and the "Commodore" about 1865.

The "Isaac Newton" was lost by fire on December 5th, 1863, while on a trip to Albany and while opposite to Fort Washington, caused by the back part of the arch of her star-board boiler blowing down and setting the boat on fire. It was found on a further examination of the boiler that the trouble was caused by the shearing of the pins which held the braces in position. There were seventeen persons badly scalded, nine of them dying of their injuries. The passengers were taken off by the propeller "D. S. Miller" and the tugboat "Herald."



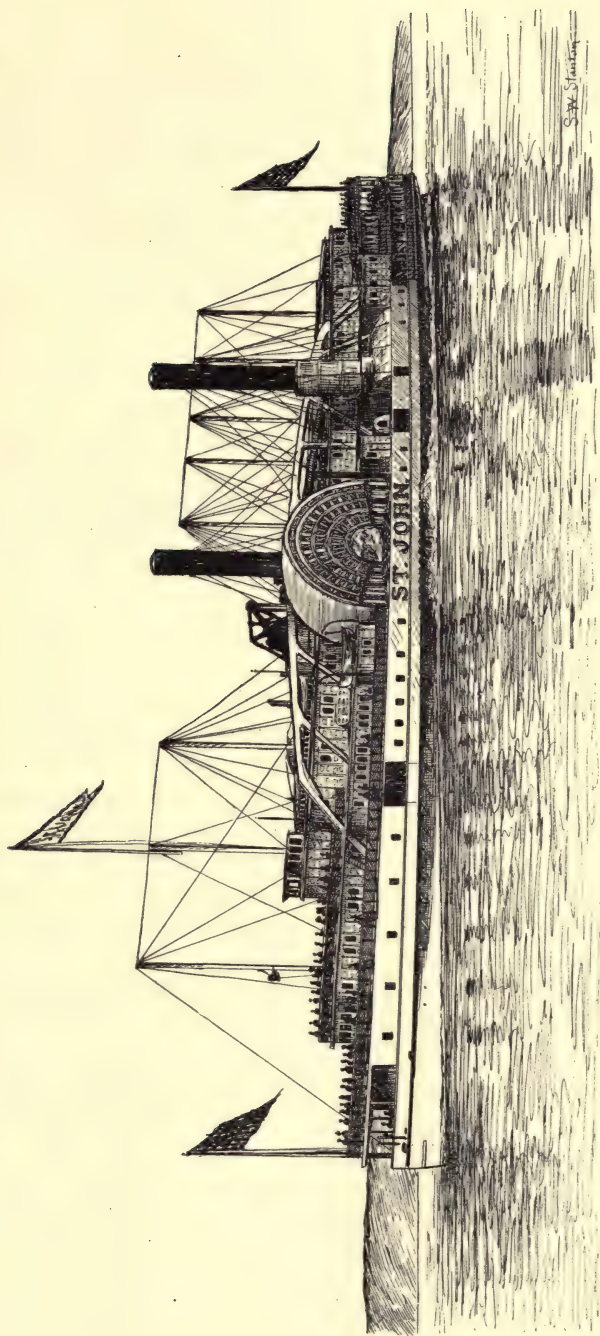
"ISAAC NEWTON."—NIGHT LINE.

S. W. Stanton.

The "New World" was dismantled in 1864, her engine refitted in the "St. John," and the hull used for a short period for a hospital ship at Fortress Monroe. The "Hendrik Hudson" was sold about 1865 for twelve thousand dollars to a New York party, who broke her up.

In 1864 the People's line had built for them the "St. John," the longest steamboat at that time, if not since, in American waters. Her engine, or a good part of it, was formerly in the "New World," but some of it required renewal for the new hull, so it was in effect a new engine. In 1865 the "Dean Richmond" was constructed for them; the engine for this vessel coming from the remains of the "Francis Skiddy," and also had many parts renewed for the new hull. In 1867 the third new vessel was constructed, the "Drew," all three of these boats being of one general style. The engine for the "Drew" was new when the vessel was built. The "St. John" and the "Dean Richmond" both met with serious disasters, but only in the case of the former were there any lives lost or injury to passengers. On the morning of the 29th of October, 1865, the "St. John," when about five miles above the city of New York, while on her trip from Albany, her port boiler exploded. By this accident fifteen lives were lost, the majority of whom were passengers. There was no evidence that there was a deficiency of water or an over-pressure of steam at the time of the explosion, but it was supposed to have resulted from the continued pulsation from the immense height of her steam chimneys. These boilers were subsequently strengthened by additional bracing. On June 14th, 1877, an accident of quite a serious nature occurred to the engine of the "Dean Richmond" while on a trip to Albany. The accident was caused by the breaking of the connecting rod. There were no lives lost or persons injured. The damage to the engine and joiner work was about twenty-five thousand dollars. The "St. John" was burned so badly on January 23d, 1885, while lying in winter quarters at her dock in New York, under the annual repairs, that it was considered undesirable to rebuild her.

After the season of 1856 the day-line business of the river was cared for by the "Armenia," with the "Broadway" and the "Metamora" until 1860. This period appears to



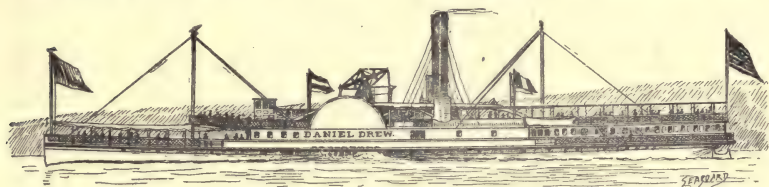
"ST. JOHN."—ALBANY NIGHT LINE.

have been one of low ebb for the day-line travel, caused partly by the increased railroad facilities along the river. At this time there was not one of the fast steamboats of five years before now on the list of claimants for the honors of high speed, and what was more, none had been built since 1852 for either the night service nor the day service. There was the "Francis Skiddy" on the night line to Troy; the "New World," on the night line to Albany; the "South America," Hudson night line; the "Alida," laid by though not permanently.

With the opening of business for 1860 more activity on the day route was promised when the "Daniel Drew" commenced running on June 5th, followed a little later by the "Armenia." During this year the "Alida" was run to Poughkeepsie by Alfred Van Santvoord for excursion, as well as through-passenger travel, to connect by railroad with passenger fare of 50 cents. This was his first entry in the passenger business on the river. In 1861 and 1862 the "Daniel Drew" and "Armenia" covered the day route as the year before. During the winter of 1862 and 1863 Commodore Van Santvoord and Captain David Hitchcock had built at Albany the "City of Albany," and on May 6th was placed on the day-line route, where she remained for a period of four weeks, or until the "Daniel Drew" came out. She proved to be a very unsuitable boat for the route. This was the beginning of the present Hudson River Day Line. The "Daniel Drew" and the "Armenia" finished the work on the route during the balance of the year. Now came a period of many changes in the day boats on the river. Van Santvoord and others bought the "Daniel Drew" from James F. Collyer and others on September 25th, 1863, the "Armenia" from Isaac P. Smith on October 7th, 1863, and just about this time made a contract for a new boat for the next season. So the fall of 1863 saw the business of the day line in the possession of Van Santvoord and others, where it has remained ever since. The high class of the vessels, their elegant fittings, and the superior service have prevented any opposition line from offering themselves up as a sacrifice for the benefit of the dear public.

The "Daniel Drew" was built in 1860 by Thomas Collyer

for the day line, he being a part owner in the vessel with Daniel Drew, but "Our Uncle Daniel" sold out his interest in January, 1861. Her engine was one that had been in the Sandy Hook tug "Titan" that was wrecked on the New Jersey coast in 1856, but her power was subsequently increased by a larger cylinder, and at the same time making heavier connections for the engine. She was at first a very crank boat, a Collyer model out and out, but the second year the hull was increased five feet in breadth, which enabled her to stand up with a heavy load of passengers on an even keel



"DANIEL DREW."—DAY BOAT. 1861.

better than before. Originally she had very short hog frames, that were of the height to the ceiling of the upper deck, and were shown externally only from aft of the water wheels to immediately aft of the after gangway. When the Prince of Wales was in the United States in 1860, the "Daniel Drew" was chartered by the royal party to convey them from West Point, where they were visiting, to Albany, on October 16th. The vessel left West Point at 11 A. M. and arrived at Albany at 4.30 P. M. She is credited with having made a few trips showing very high speed, and is considered to have made the best time between New York and Albany.

During the first season for the "Daniel Drew," in 1860, there appears to have been considerable friction between the "Alida," running to Poughkeepsie, and the "Daniel Drew," which culminated in a challenge from her agent to "any steamboat now built" for a race to Albany. There was at the time on the river but the "Alida" left of the former fleet of high-speed day boats, and it was her scalp they were after, but the challenge was declined with thanks. This was probably the last card of its kind. A few days before the "Daniel Drew" had made her famous fast trip, and it excited considerable comment on the river at the time. The *trial trip*

was postponed indefinitely, and the owner of the "Alida" acted wisely and saved her reputation.

The challenge was in these words: "The steamboat 'Daniel Drew,' having discontinued her trips on the day route for the season, will for the purpose of gratifying the curiosity of certain individuals hold herself in readiness until the 27th of the present month to make a trial trip from New York to Albany with any steamboat now built, for one thousand dollars or upwards, on one week's notice from this date, the boats to start from foot of Thirtieth street, North River, at 8 a. m., to run with their usual tackle as used in their ordinary business.

"Any person or persons having a steamer that they think can beat her have an opportunity to make a profitable trip by calling on the subscriber at 283 Broadway, Albany.

"(Signed) J. H. Harcourt.

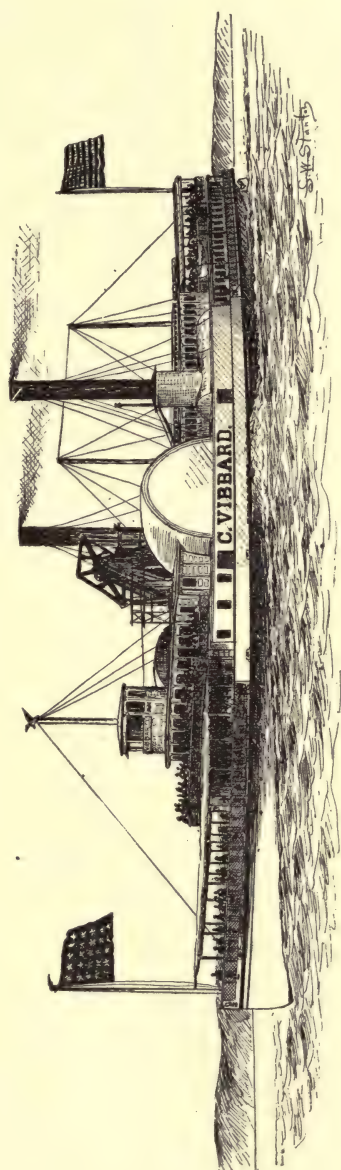
"October 17, 1860."

The "Alida" was a few years later sold to one of the large towing lines on the river, in which service she remained until 1876, when retired from active service.

The "City of Albany" was sold to the War Department on May 3d, 1863, for \$82,000, but she appears to have run on the day route for a few weeks before being turned over to the department. This vessel caught fire and was badly burned while lying at Baltimore, Md., in 1863, involving a loss of \$50,000. She was rebuilt and did good service as a transport during the Civil War, and was sold by the Quartermaster's bureau on December 20th, 1866, to J. & R. J. Gray, two captains, for \$16,000. During the next year she passed into the possession of D. D. and Tunis Smith, of Nyack, N. Y., and was known as the "Adelphi." She seems to have been an unfortunate vessel.

The "Armenia" ran with the "Daniel Drew" until the "Chauncey Vibbard" was built, when the "Armenia" was laid up as a spare boat and for occasional excursions until 1883, when sold for service on the Potomac River. The vessel was totally destroyed by fire while lying up at Alexandria, Va., on January 5th, 1886.

The "Chauncey Vibbard" was built in 1864 by Lawrence & Foulks for A. Van Santvoord and others for the day line,



"C. VIBBARD,"—DAY BOAT.

and run from June 20th of that year for two seasons, when lengthened sixteen feet. The first cylinder for her engine was 55 inches diameter, but when her hull was lengthened the old cylinder was removed, and one of 62 inches diameter substituted. It was the intention with the small cylinder to carry high steam, her boilers being tested for 55 pounds maximum working pressure. After being lengthened and with the larger cylinder, and working under a lower steam pressure, she made very good time, but some who ought to know the vessel very fully consider the changes to have been a great detriment to the vessel's speed. There was one thing about her that was very pronounced, and that was she was the hardest of any of the fast day boats to drive against a head wind, and the only reason that has been given was the width of the square front of her joiner's work. She had long, high hog frames, like all the large boats. This boat was much admired both for appearance generally as well as the ease with which she seemed to move through the water. Before being lengthened she made some fast trips, and is thought by some to be one which on an average of her time would compare favorably with those of a much wider reputation up to that date. In 1880 the two boilers that were located on the guards of the vessel were removed, and three new ones built by Fletcher, Harrison & Co. were placed in the hold of the vessel, with three smoke chimneys placed athwarthships, altering the external appearance of the vessel very much. She was subsequently sold and taken to the Delaware River.

After the loss of the "Francis Skiddy," in 1864, there were no boats running regularly to Troy, the People's line thinking they could care for the Troy travel with their Albany line, except in 1865 they ran the "Vanderbilt" and "Rip Van Winkle." About this time the People's line ran their boats to Athens, where they had docks built and buildings erected, for a few years. Passengers were here transferred by railroad over a short line, built by the New York Central R. R. Co., to Albany. In 1867 the "Connecticut" and the "C. Vanderbilt," the latter having been disposed of by Daniel Drew, were placed on the Troy line by Captain J. W. Hancox, where they remained as passenger and freight boats

until July, 1872, and subsequently were sold and converted into tow-boats for the river, at which service they were employed until about 1885. The line was not a paying investment, being run as an opposition to the People's line at cut rates of fare most of the time it was running. It is considered to have been backed by Commodore Vanderbilt to compel the People's line to abandon their landing at Athens and return to Albany, as it must be remembered Vanderbilt was the power in the railroad at this time. Both of these vessels had the vertical beam engine, and were both the subjects of accidents to their engines of a similar character within a short period. The "C. Vanderbilt," on June 5th, 1879, when abreast of Nyack, broke the strap of her working beam, which resulted in the destruction of her steam cylinder and piston. The "Connecticut," on June 12th, 1879, or just one week later, while on her way to New York, and opposite to Livingston Creek, broke the strap of her working beam also, wrecking the major portion of the engine.

The last opposition lines on the river of any moment at all, and these were up to the old standard, was that of Captain J. W. Hancox, who always made it lively when he had any competition, with the "J. B. Schuyler" and the "Twilight," in 1875, for the most of the season of that year to Albany.

In 1878 also the "Walter Brett" and the "New Champion," that had been running to Catskill as an opposition for a portion of the year. The "J. B. Schuyler" was destroyed by fire at New York, September 22d, 1897.

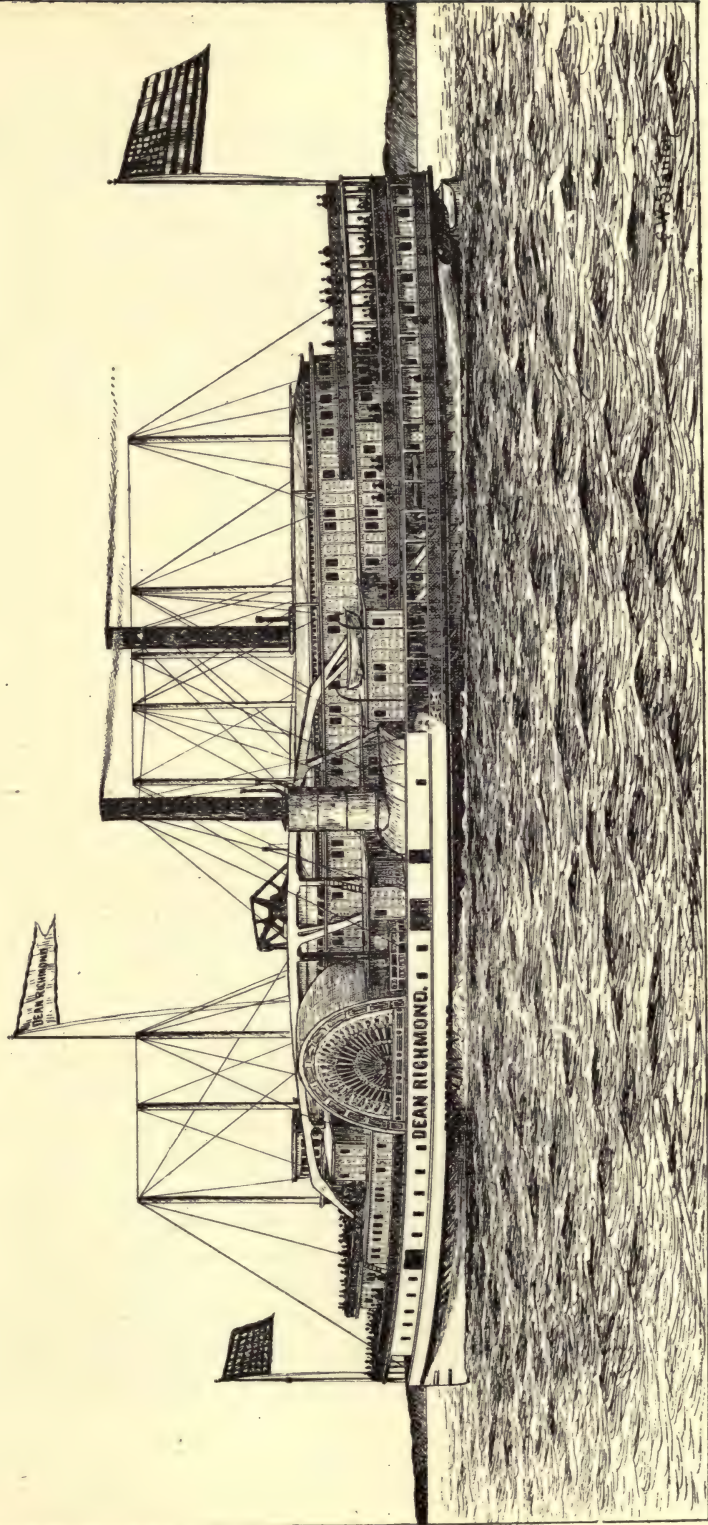
In 1871 the Citizens' Steamboat Company was organized, and early in 1872 placed the "Thomas Powell" and the "Sunnyside" on the Troy line. The "Sunnyside" ran until December 1st, 1875, when, on a trip to New York and opposite to West Park, the vessel was cut through by the ice and sunk, whereby eleven lives were lost. It was found upon an investigation, that the captain of the vessel had "turned in," and that proper discipline and organization was lacking on the vessel. The "Powell" continued to run on the line until the "City of Troy" was built in 1876. The engine for this boat was one that had been in the "Fire Cracker," which was built at New York for China waters, and the vessel while

there having been either wrecked or burned, the engine was sent to New York and subsequently rebuilt for the "City of Troy" by the Quintard Iron Works of New York. In the next year another vessel was built for the same company and named "Saratoga," as a mate to the "City of Troy." The engine for this vessel was formerly in the "Sunnyside." These two vessels are still in service, but have been rebuilt within a few years and materially improved. On the 16th of April, 1872, the "Rip Van Winkle," while on her way from Troy to New York, struck one of the main abutments of the lower Hudson River Railroad bridge at Albany, carrying away her starboard wheel and shaft, and also seriously damaging her hull and engine. She was later condemned and retired from active service. Her engine and boilers were taken out and hull broken up. No lives lost by this accident.

In 1896, the People's line having retired the "Drew" as a spare boat upon the building of the "Adirondack" in that year, have run the "Dean Richmond" with the latter ever since. The "Adirondack" was built with the intention of having a vessel of vast improvement over the other vessels of the line built over thirty years before. The vessel is much more elaborate in all her internal appointments than any night boat that has been on the river, with more power and of higher speed than the former vessels of the line. A steel-hull boat, as mate to the "Adirondack," was commenced during the fall of 1902, and has been launched as the "C. W. Morse." The "Drew" was broken up in July, 1901, at Amboy, N. J.

The present day line was incorporated June 17th, 1879, as the Hudson River line, and on August 17th, 1899, the name was changed to Hudson River Day line.

The "Albany," of the present day line, was built in 1880, the hull by the Harlan & Hollingsworth Company, of Wilmington, Del., and the machinery by W. & A. Fletcher Co., of Hoboken, N. J. The hull is of iron, being the first that was constructed of metal for use on the Hudson River since the "Iron Witch," later "Erie," of 1846. The model for this vessel was furnished by Lawrence & Foulks, of Brooklyn, N. Y., the builders of the "C. Vibbard," but it is a radical departure from the form of the latter vessel. When moving

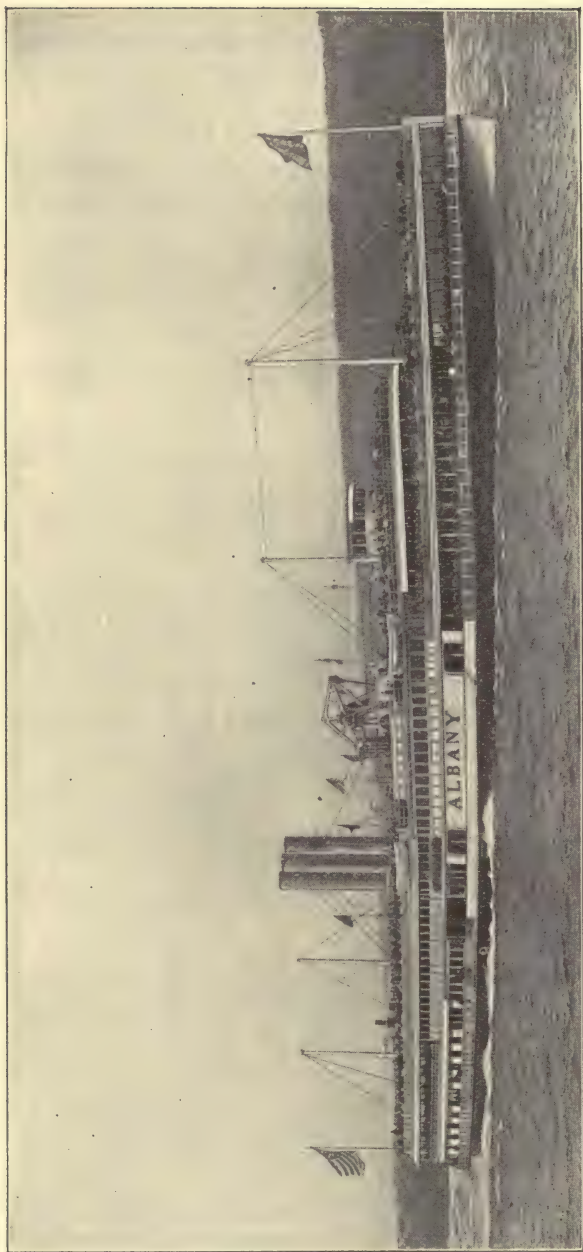


"DEAN RICHMOND"—ALBANY NIGHT LINE.

through the water at her regular speed she makes but little swell or commotion of the water, and with a heavy load of passengers shows great stability.

The joiner work is of hard wood, and the furniture and fittings of a style that is inviting to the day travel on the river. Her boilers, of which there are three, are in the hold. There are also three smoke chimneys set athwartship, as was in the case of the "C. Vibbard." These boats present an external appearance unlike any other steamboats that have been on the river, for while there have been four-pipe boats, such as the "Erie" and the "Champlain," of 1836, and the "Francis Skiddy," there have been none of three pipes and set athwartships. The four-pipe boats had two boilers on each guard. Since the "Albany's" advent on the river she has made no fast trips, as the day-line boats have, since about 1880, been run on schedule time that does not permit of their being pushed to make a record in their regular service.

The "Albany" has made a few fast runs for short distance that shows what she might do if pushed. The vessel has large power of her engine, and, when new, was allowed to carry by the steamboat inspectors a steam pressure of 50 pounds to the square inch on her boilers, although her average working pressure does not exceed 35 pounds. In the latter part of the summer of 1881 the "Albany" made the run from Tarrytown to Twenty-second street dock at New York under the following circumstances: She had been working under but two of her three boilers all the way down from Albany to Newburgh, and on arriving there it was found necessary, on account of being so far behind the schedule time, to use the third boiler, for which preparations had been made, so as to make up for the lost time. On leaving the Tarrytown ferry-boat, which met her in the river, she was "let out," and when passing the Tarrytown dock it was 28 minutes after 4 o'clock. The tide then was high water slack. The vessel was driven the greater portion of the distance under a steam pressure of 45 pounds against a moderately strong head wind, and arrived at Twenty-second street dock at 5.30 P. M., which is her schedule time, having left Tarrytown over 20 minutes late. The distance by Coast Survey Chart is $24\frac{1}{4}$ miles. She traveled considerable of this distance, no doubt, without any influence be-



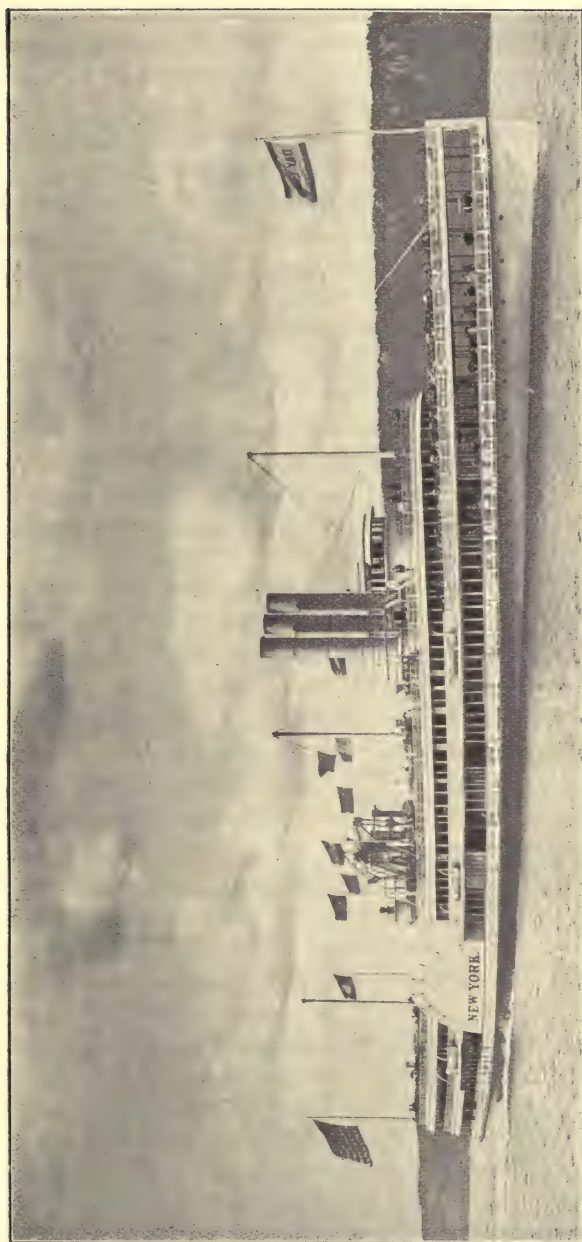
"ALBANY"—PRESENT H. R. DAY LINE.

ing received from the tide upon her speed, but probably before half the distance had been completed the vessel felt the effect of the ebb tide, which was an element in her favor. The time made on this trip was taken by three disinterested persons, who stood in the after gangway and took the time when the position they occupied was opposite the points from which they took the time. If this can be taken as a fair test of our fast river boats, and there seems no reason why it should be rejected, it is fair to assume that all articles written and talk made of 24 miles an hour *through the water*, without the aid of tide or wind, is all nonsense; this applies only to passenger steamboats, not racing machines or torpedo-boat destroyers. The average rate of speed on this run was 23.47 miles per hour, but it must be remembered that during but a portion of the time did she have any tide to benefit her speed. It is altogether probable that since being lengthened and having feathering paddle wheels fitted, the vessel will do equally as well, though there is added weight.

Of her performance *against the tide on her regular business*, the following will show the vessel to advantage. On August 28th, 1883,* her running time from Twenty-second street to the time of arrival at Hudson was 6 hours and 47 minutes; distance, $114\frac{1}{8}$ miles. Deduct seven landings, averaging four minutes each, makes the actual running time 6 hours 19 minutes, or 18.06 miles per hour. This was done with a strong ebb tide against her during most of the trip, and running under an average pressure of steam of 35 pounds. She arrived at Albany four minutes behind time, the water in the river above Hudson being very low at the time caused her detention.

In 1886, the day line had the Harlan & Hollingsworth Company build them a second iron hull that was 15 feet longer than the "Albany," and, when completed, was named "New York." The beam engine fitted in the vessel was built by W. & A. Fletcher Company, but in this case, instead of placing the shaft forward of the cylinder, as in the "Albany," placed the cylinder forward of the shaft, as in most beam engines. Feathering buckets were fitted to the

* This is from data taken on the trip by the author.



"NEW YORK"—PRESENT H. R. DAY LINE.

paddle wheels. There has been no attempt made to ascertain the maximum speed of this vessel for any distance, so far as known, and the only knowledge obtained on the subject was from a few occasions when, being detained and running behind her scheduled time, she had been driven faster than usual to find her schedule, and then she showed such high speed that interested ones claim it as high as the "Albany's" time. Her late run to Poughkeepsie confirms this.

Since these vessels were built originally they have both been enlarged in their hulls, having had thirty feet in length added to each vessel. The "Albany" was lengthened in 1892, and at the same time the radial paddle wheels were removed and those of the feathering type substituted. The "New York" was lengthened in 1897. There are no steamboats in this country that are better cared for, below deck as well as on deck, than are the day-line boats. The line increased the number of landings in New York City by stopping at West One-Hundred and Twenty-ninth street during the season of 1902.

The improvement of the channel of the upper river has been a subject that has covered a period of many years and, during the early operations, brought many disappointments to the projectors. While there has nearly always been water enough below New Baltimore for the purpose of navigation, this upper section of the river, so far as its history is known, has always been obstructed by bars and shoals, due to the existence of numerous islands and sloughs, and to the dispersion of the river water over too great an area. Since the latter part of the eighteenth century many efforts have been made, both under State and National authority, to improve the navigation of this part of the river by dredging and by the construction of dikes designed to cut off side channels, and to contract the main waterway to such an extent that its natural scour would deepen the channel to the extent required. The earliest improvements in this part of the river were made by the State of New York, and it was not until 1831, when the jurisdiction of the Federal Government had, by a judicial decision, been extended over these waters, that the general government began to consider the question of the improvement of its navigation. Since

then, partly, the improvement of the Hudson River has been conducted both by the State of New York and by the general government.

Prior to 1831, when the general government took up the question of the improvement of this part of the Hudson River, the State work had been chiefly restricted to the construction of jetties and to dredging, which resulted in no permanent improvement to the river. From 1797 to 1819 the Legislature of the State of New York appropriated over \$185,000 for the construction of jetties and dams between Waterford and New Baltimore, which resulted in transferring deposits from one place to another, which formed new islands that proved a great disadvantage to navigation without improving it. The impediments to navigation in this part of the river were so serious at this time that among other projects for improving it was the plan of a ship canal in 1804, to extend from Albany to New Baltimore, or in that locality where sufficient depth of water could be found for the purpose. This did not meet the approval of the prominent engineers of that day.

The principle of improvement adopted by the United States when it took up this question was this, namely, to control the channels by means of longitudinal dikes intended to aid in scouring away the bars and shoals, and to help this action by dredging. Under this principle the United States Government, in 1835, 1836, and 1837, constructed the Port Schuyler dike at West Troy, and the Overslaugh dike just below Albany.

Then followed a long interval of time in which no permanent improvement was made beyond some little dredging by the United States, while the State of New York also had some dredging done to relieve the embarrassment of a dry season.

It was not until 1863 that the State of New York again took up the matter of the improvement of the upper river, and, between that date and 1867, besides repairing the old dikes, constructed six new ones on the east side of the river below Greenbush to Houghtaling Island. In 1866, the general government having appropriated \$83,000 for the improvement of the river, operations were begun for repairs of the existing works that had received but little care and attention since

their construction, and this was the first step taken for the permanent benefit to navigation of the river. Since then the system of longitudinal dikes to confine the current sufficiently to allow the ebb and flow of the tide to keep the channel clear has been carried out. The United States Government has been liberal in its appropriations for the improvement of the river, and though the aggregate sum expended since 1880 is over \$2,500,000, still there has been a permanent benefit reached that could be obtained only by the outlay of large sums of money.

The depth of the channel at mean low water during the years 1819, 1852, 1878, 1900, are noted respectively on Over-slaugh bar, 5 feet, 8 feet 7 inches, 9 feet 8 inches, 11 feet 5 inches (Bogart Light Shoal); Culyer's bar, 4 feet, 7 feet 5 inches, 9 feet 5 inches, 12 feet; Coeyman's bar, 5 feet, 7 feet 5 inches, 9 feet 3 inches, 12 feet.

The purpose of the government at this time in the further improvement of the river is to maintain all the permanent structures, and to construct a few new ones; also to deepen the entire reach under improvement so as to afford a channel 400 feet wide and 12 feet deep at mean low water from Cox-sackie to Troy.

At this period the steamboat channel in the upper Hudson River is maintained by the Federal government, while the side cuts at West Troy and Albany and Albany basin are maintained by the State of New York.

DETAILS OF SOME OF THE HUDSON RIVER STEAMBOATS.

"North America," 1840, hull built by Devine Burtis, at Brooklyn, N. Y., 230'x26'x9'; one vertical beam engine by James Cunningham, 48 inches cylinder by 11 feet stroke; water wheels, 28'x10'; two iron boilers of Milliken's patent.

"South America," 1841, hull built by Devine Burtis, at Brooklyn, N. Y., 260'x26'9"x9'3; one vertical beam engine by James Cunningham, of New York, 54 inches cylinder by 11 feet stroke; water wheels, 30'x11'; two iron boilers of Milliken's patent; average pressure of steam, 45 pounds per square inch, cutting off at half the stroke.

"Troy, 1841, hull built by William Capes, at Brooklyn, N. Y., 295'x30'x9'4.; two beam engines from the Hudson River

steamboat "Erie," and fitted in the hold of the vessel as Lighthall's horizontal beam engines, having cylinders each 44 inches diameter by 10 feet stroke; water wheels, 29'x12'.

"Empire," 1843, hull built by William H. Brown, of New York, 307'6x30'6x9'9; two of Lighthall's horizontal beam engines in the hold of the vessel, having cylinders each 48 inches diameter by 12 feet stroke.

"Knickerbocker," 1843, hull built by Smith & Dimon, of New York, 291'6x31'6x9'6; one vertical beam engine from Hudson River steamboat "DeWitt Clinton," having cylinder 65 inches diameter by 10 feet stroke, refitted in vessel by Hogg & Delamater, of New York.

"Oregon," 1845, hull built by Smith & Dimon, of New York, 318'x35'x10'; one vertical beam engine, built by Novelty Iron Works, of New York, with cylinder of 72 inches diameter by 11 feet stroke; water wheels, 34'x11'.

"Niagara," 1845, hull built by William & Thomas Collyer, at New York, 265'x28'6x9'3; one vertical beam engine by Hogg & Delamater, with cylinder 60 inches diameter by 11 feet stroke; water wheels, 30'x11'; cylinder was subsequently increased to 65 inches diameter.

"Rip Van Winkle," 1845, hull built by George Collyer, at New York, 240'x26'6x8'8; one engine having cylinder 54 inches diameter by 10 feet stroke.

"St. Nicholas," 1845, hull built by William H. Brown, 180'8x26'6x9'; one vertical beam engine having cylinder 40 inches diameter by 11 feet stroke; water wheels, 29'6x8'4.

"Isaac Newton," 1846, hull built by William H. Brown, at New York, for Captain Peck, under the name of "George Washington," but was changed before launching, 338'x40'x11'; one vertical beam engine by Allaire Works, having cylinder 81 inches diameter by 12 feet stroke; two iron boilers; water wheels, 39'x12'.

"Metamora," 1846, hull built by Lawrence & Sneed, at New York, 165'x25'x8'; one vertical beam engine, 40 inches diameter by 10 feet stroke, by Pease & Murphy, of New York.

"Roger Williams," 1846, hull built by Devine Burtis, at Brooklyn, N. Y., 212'x27'x9'; one vertical beam engine by Henry R. Dunham & Co., Archimedes Iron Works, having

cylinder of 44 inches diameter by 11 feet stroke; one iron boiler in the hold of the vessel; water wheels, 28'7x8'2.

"Thomas Powell," 1846, hull built by Lawrence & Sneed, of New York, 225'x28'6x9'6; one vertical beam engine, 48 inches diameter of cylinder by 11 feet stroke, built by T. F. Secor & Co., of New York City; two boilers on the guards; water wheels, 29'6x9' face.

"Armenia," 1847, hull built by Thomas Collyer, of New York, 185'x28'x8'6 originally; one vertical beam engine by Henry R. Dunham & Co., having cylinder 34 inches diameter by 14 feet stroke, but subsequently increased by substitution of a 40 inches cylinder; water wheels, 29'4x8'3; originally one iron boiler below deck, subsequently two boilers.

"Alida," 1847, hull built by William H. Brown, of New York, 276'x28'6x9'6; one vertical beam engine by Henry R. Dunham & Co., having cylinder 56 inches diameter by 12 feet stroke, but subsequently power increased by substitution of a 62 inches cylinder; water wheels, 32'8x9'6; two iron boilers on guards; working pressure of steam, 40 pounds, cutting off at one-half the stroke.

"Manhattan," 1847, hull built by Devine Burtis, 256'6x26'5x8'8; one vertical beam engine of 50 inches cylinder by 11 feet stroke.

"New World," 1848, hull by William H. Brown, of New York, 371'x47' (originally 36')x10'4; one vertical beam engine by T. F. Secor & Co.—Morgan Iron Works, of New York, later date—having cylinder of 76 inches diameter by 15 feet stroke; two iron boilers on guards; water wheels, 45'x12'; working pressure of steam, 45 pounds, cutting off at 8 feet of the stroke.

"Joseph Belknap," 1849, hull built by Thomas Collyer, 187'x27'4x8'; one vertical beam engine built by Henry R. Dunham & Co., having cylinder 40 inches diameter by 12 feet stroke; water wheels, 28'10"x8'; two iron boilers in the hold.

"Reindeer," 1850, hull built by Thomas Collyer, of New York, 260'x34'x9'9; one vertical beam engine by Morgan Iron Works, having cylinder of 56 inches diameter and 12 feet stroke; two iron boilers in the hold, of the double return flue type, each 20 feet long, 10 feet 6 inches width of front, and 10 feet 6 inches diameter of cylindrical shell, with two

furnaces; working pressure of steam, 40 pounds, cutting off one-half; water wheels, 33'6"x9'6".

"Francis Skiddy," 1850, hull built by George Collyer, 325'x38'6x11'6; one vertical beam engine by Belknap & Cunningham, of New York, having cylinder of 70 inches diameter by 14 feet stroke, with four iron-flue boilers, two on each guard, each 28 feet long by 8 feet diameter, of cylindrical shell, and operated under a pressure of 40 pounds to the square inch, cutting off at 7 feet 6 inches; water wheels, 40'x11'.

"Henry Clay," 1851, hull built by Thomas Collyer, of New York, 198'6x27'6x7'4; one vertical beam engine by Belknap & Cunningham, of New York, with cylinder of 44 inches diameter and 12 feet stroke.

"Glen Cove," 1854, hull built by Thomas Collyer, of New York, 195'5x32'x8'6; one vertical beam engine from the "Henry Clay."

"Daniel Drew," 1861, hull built by Thomas Collyer, 251'8 on deck, 244 feet load-water line, by 30'6x9'3 depth of hold; one vertical beam engine from the tugboat "Titan" of 60 inches diameter of cylinder by 10 feet stroke, refitted in vessel by Neptune Iron Works, of New York; a 68 inches cylinder replaced the original shortly after; water wheels, 29'x9'; two return-flue boilers; working pressure of steam, 35 pounds, cutting off at one-half, with 26 revolutions at that pressure.

"Mary Powell," 1861, hull built by M. C. Allison, of Jersey City, N. J., 286'x34'3x9'; hull rebuilt 1875, and again in 1881, by Ward, Stanton & Co., of Newburgh, N. Y.; one vertical beam engine, built by Fletcher, Harrison & Co., of New York, later A. & W. Fletcher & Co., of Hoboken, N. J., having cylinder 62 inches diameter by 12 feet stroke, that was increased to a 72 inches by 12 feet in 1874, when two steel boilers were added of the flue-return tubular type; water wheels, 31'x10'6.

"Chauncey Vibbard," 1864, hull built by Lawrence & Foulks, of Brooklyn, N. Y., 265'x35'x9'6, but was subsequently lengthened; one vertical beam engine, built by Fletcher, Harrison & Co., having cylinder 62 $\frac{1}{4}$ inches diameter by 12 feet stroke; water wheels, 30'2x9'6.

"Berkshire," 1864, hull built at Athens, N. Y., 266'x35'x9'6; one vertical beam engine, formerly in the Hudson River steamboat "South America" of 1841, rebuilt and fitted

in vessel by Fletcher, Harrison & Co., having cylinder of 54 inches by 11 feet; water wheels, 30'x9'.

"St. John," 1864, hull built by John Englis & Son, of New York, 393'x51'x10'2; one vertical beam engine, formerly in the steamboat "New World," rebuilt by the Allaire Works, but given a cylinder of 85 inches diameter with a stroke of 15 feet; water wheels, 48'x10'6".

"Dean Richmond," 1865, hull built by John Englis & Son, of New York, 348'x46'x10'6; one vertical beam engine, formerly in the "Francis Skiddy," but rebuilt by the Allaire Works and given a cylinder of 75 inches diameter by 14 feet stroke.

"Drew," 1867, hull built by John Englis & Son, of New York, 366'5x47'5x10'8; one vertical beam engine, constructed by the Allaire Works, with a cylinder of 81 inches diameter by 15 feet stroke.

"Saratoga," 1877, hull built by John Englis & Son, at Brooklyn, N. Y., 282'x36'x10'; one vertical beam engine, formerly in steamboat "Sunnyside," but given a cylinder of 60 inches diameter by 12 feet stroke; water wheels, 32'x9'.

"Albany," 1880, iron hull built by The Harlan & Hollingsworth Co., of Wilmington, Del., 285'x40'x11'6; one vertical beam engine, built by W. & A. Fletcher Co., having cylinder of 73 inches diameter by 12 feet stroke; three lobster-back boilers; originally had radial water wheels, 32'x11'10.

"Kaaterskill," 1882, hull built by Van Loan & Magee, at Athens, N. Y., 265'x38'x10'; one vertical beam engine, by W. & A. Fletcher Co., having a cylinder of 63 inches diameter by 12 feet stroke; two lobster-back flue boilers; water wheels, 31'x10'.

"Adirondack," 1896, hull built by John Englis & Son, at Brooklyn, N. Y., 388'x50'x12'; one vertical beam engine, having a cylinder of 81 inches diameter by 12 feet stroke, by W. & A. Fletcher Co.

The two disturbing elements in early times on the Hudson River were the

"Express," 1841, hull built at New York, 172'x23'x8'3, with a "square" engine of 32'x10'.

"Napoleon," 1829, hull built by Smith & Dimon, at New York, 134'6x25'6x6'7, with a square engine 31"x6'.

HUDSON RIVER TOWNS.

X Prior to the opening of the Hudson River Railroad from New York to Albany in 1851, there were steamboat lines to most of the important points on the river, this being the most expeditious mode of traveling, previous to the date named, between the various towns on the river. The boats did not make as many landings as they did at a later date—that is, the way boats—four landings being about the average between the terminal points. The consequence was, there were a larger number of steamboats on the river than at a later date, X which accounts in a measure for the lively times that existed at periods, when trials of speed of the different vessels were indulged in.

HUDSON.

From about 1830, for a longer or shorter period, run the "Legislator," the "Westchester," this boat at one time belonged to Cornelius Vanderbilt; the "General Jackson," another of Vanderbilt's, a very indifferent vessel; the "Superior" and "Fairfield," this was a small vessel that was built by Captain Peck and had run to Bridgeport, Conn., from New York about 1838, and 1842 for a few years to Hudson. About 1852, the "South America" and the "North America," that had run in the People's line for many years, were placed on the New York and Hudson line where the former run until about 1862. The "Columbia" also run for a few years prior to 1860. About the last work the "South America" and the "North America" done was in the transport service. The "South America" was chartered on May 6, 1862, by the New Haven Steamboat Company, and the charter expired February 20, 1863, at \$400 per day. The "North America" was chartered by J. W. Hancox in 1862 and 1863 at \$400 and \$325 per day, respectively. She was sold by her owners, Daniel D. Chamberlain and Joseph W. Hancock, to the government on July 9th, 1863, for \$55,000. She sank at Algiers, Louisiana, on October 8th, 1863. The "Connecticut" made a landing here a portion of the time when running to Troy. The "Rip Van Winkle" and the "Oregon" also stopped here about the same time.

In 1864 the "Berkshire" was built at Athens, N. Y., and the engine from the "South America" was fitted in the vessel.

This vessel had been running to Hudson but a few months, when on a trip to New York, on June 8, 1864, took fire in the lamp room and was almost totally destroyed, with thirty-five persons being drowned in their efforts to reach the shore. As soon as the fire was discovered, the vessel was headed for Esopus Island and beached. The main deck was filled with baled hay as freight, to which the fire rapidly spread, giving small chance to save the vessel. The owners of the vessel were Geo. H. Powers, Milton Martin and others. What was left of the hull was raised and rebuilt, and fitted with a beam-propeller engine and named "Nuhpa," that run on the Hudson River for some time with the "W. C. Redfield." This vessel was afterwards purchased by the Vermont Central Railroad Company and run as a freight steamer from New York to New London, Conn., under the name of "Metropolitan." She will be remembered at this time as having very high and heavy hog frames. She went out of use about 1896.

For several years the propellers, "W. C. Redfield" and the "Thomas McManus" performed the service on the Hudson night line until 1890, when the former was purchased, and two years later the "McManus," by the Catskill Company, who still continue to operate the line.

CATSKILL.

The "Frank," a small steamboat of 135 feet long, with a square engine of 30 inches by 6 feet, built for James P. Allaire to run from New York to landings on the Shrewsbury River, New Jersey, was placed about 1838 on the route from New York to Catskill, where she remained for three years, carrying passengers and towing barges. Afterwards the "Washington," a larger boat than the "Frank," was engaged on the route until 1845 or 1846, when the "Utica," that had been on the Albany night line, was put on as a consort to the "Washington," where they remained for several years. Catskill was considered by the Albany lines as a good landing for passengers, and consequently was well served with accommodations in the number of steamboats which made that point a landing place. It was always one of the objects of the competing lines before 1850, in their trips down the river, to endeavor to arrive in advance at either Hudson or Catskill, and thus secure the passen-

gers waiting to go down the river, and often the racing for the landing has been very exciting and much enjoyed by the passengers on the rival steamboats.

In 1863 the "Thomas Powell" was on this route, having been lengthened and state rooms added, where she remained for several years, and at a later date the "Sunnyside," and for a time the "New Champion." The two former were withdrawn in the spring of 1872.

The "New Champion" and the "Andrew Harder," a propeller, formed a line to this landing in 1872, 1873 and 1874, and during the years 1875-1876, the former, with the "Walter Brett" x "Mary Benton" that had seen much service as a transport during the Civil War. In 1877 the "Charlotte Vanderbilt" and the "Escort" were added to the traveling facilities of Catskill, and a lively opposition was maintained between the two lines until 1879, when the latter, known as the New York and Catskill Steamboat Company, bought the "Walter Brett."

Since the organization of the new company they have built the "City of Catskill," in 1880, by Van Loan & Magee, at Athens, N. Y., and in 1882, the "Kaaterskill," a much larger and better appointed vessel than had ever been on the route before, by the same builders. This latter vessel was first placed in service in August, 1882, and had been running less than a month, when on a trip down the river and in the vicinity of Stony Point, her engine was disabled by the breaking of the strap of the working beam. The connecting rod in falling broke the main steam pipe, and one person died from inhaling the escaping steam and several were severely scalded. On July 14, of the same year, the "Charlotte Vanderbilt," while on a trip down the river and about one mile above Esopus light, was run into by the steam yacht "Yosemite," bound to Catskill, and cut in two at the forward gangway, causing her to sink immediately. The Catskill boat had no passengers on board at this time, being now used as a spare boat and employed in carrying freight. Then to round out the triple to break the spell, the "City of Catskill," while under charter to run to Rondout, was burned at her dock February 11, 1883. The company was very unfortunate at this period with their boats. The "Escort" was rebuilt in 1883 and name changed

to "Catskill." She was in collision with the steamboat "St. John" when opposite Fifty-eighth street, New York, on September 15, 1897, when she was cut down and sank, two lives being lost at the time. The vessel was raised and rebuilt and named "City of Hudson."

The present name of the New York, Catskill and Athens Steamboat Company was acquired at the time of the purchase of the Hudson line boats—"William C. Redfield," in 1890, and "Thomas McManus," in 1892, when Hudson and Athens interest entered the company. These two propellers run to Hudson and Coxsackie, thus giving the company control of all the water transportation above Catskill to Stuyvesant under the name of the Catskill Evening line. The "Thomas McManus" was destroyed by fire while lying at her dock at New York, on August 26th, 1902.

The first iron-hull vessel owned by the company was built for them in 1898, at Newburgh, N. Y., with the machinery by W. & A. Fletcher Company, named "Onteora," and has proved a valuable addition to the line. She has justly earned her place of the queen of the state-room boats of the river, for in the first summer of her service she made the trip from New York to Catskill, with one landing, in 5 hours and 25 minutes.

"City of Catskill," 250'x35'8"x10'9'; beam engine, 56"x12'.

"Kaaterskill," 265'x38'x10'; beam engine, 63"x12'.

"Onteora," 236'7"x35'2"x10'; beam engine, 55"x10'.

SAUGERTIES.

In the early days of steam navigation on the river, Saugerties did not have a line of steamboats making that town one of the terminals of the route; it had no further accommodations than being used as a landing place of the Albany as well as the Hudson way line of steamboats, one of the boats during the early forties being the "Robert L. Stevens." This vessel was built in 1835, at Kingston, N. Y., and fitted with a beam engine constructed by the West Point Foundry, New York City, of 36-inch cylinder, 10 feet stroke, and subsequently increased to a 42"x10'. The hull of the vessel was 175'x24'x8'; and her paddle wheels were 22 feet diameter by 11 feet face. The "James Madison," that in her earlier days was running to Newburg and of about the same size as the "R. L. Stevens,"

also served this landing for a time. There were other boats that tried to build up a travel from this landing at various times, but none seemed to remain for any length of time other than the "R. L. Stevens" that went out of existence in 1861. There was another steamboat that run here a short time just prior to the Civil War, the "Charlotte Vanderbilt." This vessel was built by B. C. Terry, at Keyport, N. J., in 1857, and was 207 feet long by 28'6x8'3, and was fitted with *side propellers*—screw propellers fitted on the side of the vessel in the place of the ordinary radial wheel—with the expectation of being able to drive her at a high rate of speed, and to make the trip between New York and Albany and return between sunrise and sunset during the long days of the year. The vessel was launched under the name of "Eureka," but the name was changed before her final completion to "Charlotte Vanderbilt." The hull was divided into 16 water-tight compartments, with a fore and aft bulkhead on the centre line of the vessel and for about every twenty feet there was a partial thwartship bulkhead. The propelling agency in the vessel was the novelty of her construction, she having one screw propeller of 14 feet diameter by 25 feet pitch on either side of the vessel, each screw being operated independently of the other by a pair of oscillating engines, having cylinders of 24 inches diameter by 24 inches stroke. Steam was furnished by two Whitaker patent vertical tubular boilers, 18 feet by 9 feet diameter, and intended for a working pressure of 100 pounds and located on the main deck. The machinery was built and placed in the vessel by William Birkbeck, Fulton Foundry, Jersey City, N. J. The vessel was designed by Captain Harry Whitaker, and D. J. Townsend, of Buffalo, N. Y., was the backer of the enterprise. When the vessel was nearly completed, internal dissensions appear to have arisen among those interested, and financial troubles fell upon the enterprise, and it was finally abandoned about a year and a half after it was started. There was a trial trip made in May, 1858, where it was claimed that the vessel had a speed of about 13 miles an hour for 3 hours under a steam pressure of 50 pounds, the propellers making 76 revolutions per minute. All of these vessels seem to have done fairly well when running light, but just as soon as the draft was increased by a load they were

tied up in speed. When the "Robert L. Stevens" was dismantled in 1861, her engine was placed in this vessel, the old machinery having been removed some time previous and the ordinary side wheels substituted, and her name shortly after changed to "W. F. Russell," running under this name but a short time when the original name was taken up again. She was chartered by Anthony Reybold, of Baltimore, Md., to the War Department in June, 1862, until May, 1865, at from \$240 to \$300 per day under several charters, under the name of "John Tucker." From 1865 to 1871, she was in service at Baltimore, Md.

The last of this side-propeller type of vessel in this country, for there were some constructed in the early period in Great Britain, was one built by Samuel Pine, of Greenpoint, N. Y., for John B. Root, in 1882, as a small lighter to carry sugar around the coast of Cuba and named the "Damuga." The vessel was 100 feet over all, 30 feet beam and 4 feet 6 inches hold, with three fore and aft bulkheads in the hold. No record seems to have been left of the machinery of the vessel, excepting that she had two side propellers well aft of the centre of the length of the vessel. She was a complete failure.

During the period from 1861 to 1864, there were several boats that filled the service to this landing, the most prominent being the "Rip Van Winkle." In the latter year the "Ansonia" was purchased for the route, her last employment being a charter by the War Department at \$700 per day, while under the control of Walter Brett & Company. This vessel was rebuilt in 1891 and lengthened 15 feet, and an engine from the tugboat, Joseph Johnson, that was sunk about 1886, of 42 inches by 8 feet put in place of the original engine that was a 36-inch by 11 feet. The name of the rebuilt vessel was changed to "Ulster." In February, 1903, the vessel was rebuilt again, mainly by adding two feet to the top timbers of her frame, so as to give her more freeboard.

The "Ansonia" was the only boat running to Saugerties from 1864 to 1888, when the company purchased the "Shenandoah" from the Old Dominion Steamship Company, being one of their James River steamboats built in 1882, at Brooklyn, N. Y., and fitted with an engine from the "Nath. P. Banks,"

built in 1863, of 36"x10' stroke, and the name of the purchased vessel was changed to "Saugerties."

In the division of the territory among the several lines on the river by mutual agreement, that lying between Hyde Park on the south and Saugerties on the north was placed at the service of the Saugerties line. How much better such affairs are arranged at this period between several interests that might become antagonistic, than the earlier steamboat owners settled such affairs. Then they often secured harmony with a club.

RONDOUT AND KINGSTON.

Rondout was in the early days of steam navigation on the Hudson River like many of the upper Hudson River towns situated on the west side of the river, had no special line of steamboats making this landing a terminal.

In 1836 the "General Jackson" was running to Rondout, and where had she not run before being laid aside? For some few years the "Victory," a vessel of 139'x25'x9', used later as a tugboat by the Delaware & Hudson Canal Company in towing their coal barges to New York, was also carrying passengers from Kingston. The canal of the Delaware & Hudson Coal Company was completed in 1830, and their barges were towed by some of the steamboats on the river until they had obtained the "Victory." At a later date the "Highlander," the "North America" and the "Manhattan" stopped there at various times. At a later period there was a propeller named the "Sherman," afterwards called "Elmendorf," that was carrying passengers and freight, but not for a great length of time.

In 1860 the "James W. Baldwin" was built for the Romer & Tremper Company, at Jersey City, N. J., for the route with way landings, and in the year following the "Thomas Cornell" was added, the vessel being built at Brooklyn, N. Y. These two boats formed the night line, with way landings to Rondout, until the "Thomas Cornell" run ashore in a dense fog at Danskammer's Point on March 27, 1882, where she proved a total loss. The "City of Catskill," of the New York and Catskill line, was chartered to take her place on the line, where she remained in service during the whole of that season, but on February 11th, 1883, while lying in winter quarters at Rondout.

was consumed by fire. During the season of 1883 the "City of Springfield," of the New York and Hartford line, run part of the season with the "James W. Baldwin." During the same year the Harlan & Hollingsworth Company completed an iron-hull propeller for the Cornell Steamboat Company, named "City of Kingston," to run with the "James W. Baldwin." She proved to be a valued acquisition to the line, possessed of more than ordinary speed and an economical consumer of coal for her power. In October, 1889, the vessel was sold to parties who took her to the Pacific Coast, where she was used until sunk by collision with the steamship "Glenogle," in Puget Sound, on April 23, 1899. After the sale of the "City of Kingston" the Romer & Tremper Company acquired the right to all the business of the night line to Rondout, and as it would take too long a time to have a vessel built that was especially adapted for the business on the route, they purchased the "Mason L. Weems," built at Baltimore in 1881. She has since run with the "Baldwin" under the name of "William F. Romer" on the night line.

In 1861, the "Mary Powell" was built for the day route to Rondout, stopping at the principal landings between there and New York, leaving Rondout in the morning and New York in the afternoon. The hull of this vessel was built by M. S. Allison, of Jersey City, N. J., while her machinery was constructed by Fletcher Harrison & Company, of New York. The original cylinder of this engine was 62 inches diameter, but in 1875 one of 72 inches was substituted. In 1880 the hull of the vessel was rebuilt by Ward Stanton & Company, of Newburg, N. Y., and in 1889 was again rebuilt.

This vessel has a large number of admirers for her fine model, and who consider that she is able to make better time than any steamboat that has been on the river as far as Rondout, and some even go so far as to say that to certain points on the river her time has never been equalled.

There has been, since the "Albany" and the "New York," of the Hudson River day line, have been running, considerable discussion at one time and another in steamboat circles of the question, Which is the fastest boat, the "Mary Powell," the "Albany," or the "New York?" Each have their admirers, who are positive in their opinions of the superiority of their

favorite, but it is very doubtful if the question will be practically settled, as to the relative speed of these vessels by a trial.

There is one thing to answer satisfactorily, it would seem, for the "Mary Powell" to maintain the claim of the "Queen of the Hudson." In October, 1871, the "Mary Powell," being at this time the property of A. Van Santvoord and J. Mc. B. Davidson, but sold to A. L. Anderson July 1, 1872, made four round trips on the Albany day line, and during that service was unable to make as good running time as her consort, the "Daniel Drew," running on opposite days. If she was the "Queen of the Hudson," as claimed, why did she not maintain that reputation while running on the day line?

The best time made by the "Mary Powell" as far as Newburg was in August, 1874, with a good flood tide and a south wind, from Vestry street pier, which she left at 3.32½ P. M., and arrived at Newburg at 6.19¾ P. M. Running time, 2 hours 47¼ minutes, including landings at Cozzens, West Point and Cornwall. Running time, deducting landings, 2 hours and 38 minutes. The run has several times been made by the vessel under very favorable conditions of tide in 2 hours and 50 minutes. These have all been made during the regular course of her business, but, like all fast trips, conditions were favorable and extra effort was made to cut the time. It was claimed some years ago that the vessel made the run to Rondout in 4 hours and 20 minutes, making all her landings. Taking her courses on the river, the distance is about 90 miles. It is safe to give her the credit of being the Queen of the *Lower Hudson River* lines.

POUGHKEEPSIE.

This has always been a good landing for the steamboats on the river, it being just half way between New York and Albany, and having many public roads leading into the adjacent farming districts, naturally brought a good deal of travel and freight to this landing.

The first steamboat to make this landing a terminal was the "Fire Fly," in 1814, and for two years later, making three round trips a week. This was one of Fulton and Livingston's boats, and was the smallest of the fleet. Landings were made at four other points to New York. Subsequently, they had the

"Paragon," and still later the "Richmond." The latter was the last vessel completed by Robert Fulton, and had one of those geared engines that made sufficient noise when in operation to keep a heavy sleeper awake by its noise. After the "Richmond" came the "Providence"—the "Little Providence"—another old-timer of 89 feet in length with a square engine of 24 inches by 4 feet stroke. In 1838, the "Emerald," a larger boat than either of those named, was in service to this landing. Sometime later the "Eureka," a boat of 180 feet long, was running for a time. There were also the through boats making landings.

When the Hudson River Railroad was opened to this point in 1849, the business by water fell off during the next season to such an extent that it was no longer a profitable investment in running to many of the way points on the lower part of the river, although this landing has always been well served by the better class of day boats. The first section of the Hudson River Railroad was opened for the transportation of passengers from New York to Peekskill on September 29th, 1849, and on the 6th of December following was completed to New Hamburg, and on December 31st, 1849, was finished to Poughkeepsie. In July, 1850, Hudson was connected with New York by rail, and on October 3d, 1851, the first passenger train passed over the entire road between New York and Greenbush in 3 hours and 55 minutes.

In 1860-1861 Lawrence & Foulks built for Hamilton & Smith the propeller "Isaac Smith," whose dimensions were 165'x32'x9' and fitted with a beam-propeller engine of 44-inch cylinder by 5 feet stroke, constructed by Fletcher, Harrison & Company. This vessel was sold to the Navy Department when finished, for the gunboat service on the southern rivers, for \$50,000, and retained her original name. She was captured by Confederate land forces in January, 1863, while doing duty in Stono River, S. C.

In 1862 the same builders of the "Isaac Smith" finished another of same style of propeller for same parties and named "D. S. Miller," but the engine was 44-inch cylinder by 6 feet stroke and geared up to about 3 to 1. In 1864, a third vessel was built for same parties, of slightly increased dimensions,

with same type of engine of 45-inch cylinder by 6 feet stroke, and named "John L. Hasbrouck."

There were four other steamers fitted with the beam-propeller engine about this period in New York waters. In 1861 Lawrence & Foulks constructed the "Flambeau" for the China trade, but the government chartered the vessel when completed. She was 185'x30'x11', with the machinery by Henry Essler & Co., of Brooklyn, N. Y., having cylinder 50 inches diameter by 5 feet stroke; propeller, 10 feet diameter by 18 feet pitch. In 1862 Lawrence & Foulks built for P. S. Forbes, for China waters, the "Shan-Sco," of 210'x33'x18', with beam-propeller engine by Fletcher, Harrison & Co., having cylinder 50 inches by 6 feet stroke. Also the same year the same builders constructed for same party the "Sze-Chum," of same dimensions as the former vessel, with engine of same size, built by Henry Essler & Co., of Brooklyn, N. Y. This vessel had two flue boilers in the hold and propeller 10'6 diameter. Then there was the "Nuhpa" that run on the Hudson River, and, as the "Metropolitan," from New York to New London for many years.

In the consolidation of the lower Hudson River lines a few years ago the "Daniel S. Miller" and the "John L. Hasbrouck" were included. Their names were shortly after changed, the "D. S. Miller" to "Poughkeepsie," and the "J. L. Hasbrouck" to "Marlborough." The former was sunk in a fog while on a trip to New York by going ashore at Stony Point, on March 21st, 1901, but was afterwards raised and fitted for service.

NEWBURG.

To Newburg, the first steamboat that is found to have made it a landing other than the New York and Albany way lines was the "William Young," in 1831, that made Low Point, a few miles above Fishkill, the upper end of her route. This was a small boat of 113'10x23'4x7'8 dimensions of hull and had a square engine of 40"x5' stroke. She run here for over five years, and was still on the Hudson River in 1850. In 1833, the "Washington," a larger boat, of 162 feet long, also run here for a time, and at a later period was on the lower Hudson River, and on the Catskill line.

In 1835 more interest was taken in the steamboat service to this landing, for Messrs. Thomas Powell, Robert Wardrop, and Samuel Johnson contracted with Lawrence & Sneed, of New York, to build the hull of a steamboat of the dimensions of 175-feet long, 24 feet beam and 8 feet hold, and with the West Point Foundry, of New York, to build the machinery for the vessel named "Highlander." The beam engine was a 40-inch cylinder by 10 feet stroke, with water wheels 20 feet diameter by 9 feet face, and two iron boilers on the guards.



"HIGHLANDER."

The next year when the "Highlander" was on the route, a vessel that had just been finished at Philadelphia, Pa., a short time before, constructed by J. Vaughan, also having a beam engine of the same size as the "Highlander," but was 10 feet greater length of hull and named "James Madison," appeared on the route as an opposition, and the contests of speed between these rivals were frequent for a long time. The Delaware River people thought they were going to carry off the flag with ease when coming into the "enemy's country," but they had not counted on the length of the miles on the Hudson River, for they often saw their rivals' stern in a contest. They did not mind racing steamboats in those days, and when the contest was to be of any moment and announced beforehand, the builders of the engines, or a representative, were often on board to aid in operation of the engine, or to give advice. The "Highlander" remained on the route until the "Thomas Powell" was built in 1846. The "James Madison" was subsequently put into service as a towboat on the river, and her engine was afterward used in the towboat "A. B. Valentine."

In 1846 Thomas Powell and others had constructed by

Lawrence & Sneed the "Thomas Powell." The hull* was 225'x28'6x9'6; draft, 5 feet 6 inches; beam engine built by T. F. Secor & Co.; 48-inch cylinder and 11 feet stroke; two iron boilers on the guards; average pressure of steam, 50 pounds, cutting off at 8 feet; consumption of anthracite coal, 2 tons per hour; water wheels, 29 feet 6 inches diameter by 9 feet length of paddles. This vessel did not run to Newburg after the winter of 1848, for we find that she was sold to the New York and Erie Railroad Company in April, 1849. For some time prior to the latter date, Thomas Powell had been interested in the New York and Erie Railroad through the absorption of the Newburg branch of which he was the moving spirit in its organization as the Delaware and Hudson Railroad in 1836. Homer Ramsdell, at the former date, was in the Board of Directors of the Erie Railroad Company, and its



"THOMAS POWELL."

President from 1853 to 1857. The "Thomas Powell" was always a favorite with the traveling public on the river, and was considered as of more than average good speed. During the first four years of the vessel's service on the river, there were more steamboats of high speed on the Hudson River than at any previous period, and it is no exaggeration to say that the "Thomas Powell" would be found as one of the best on a run to Newburg. Her best record is for August 16th, 1846, on a trip from New York to Newburg. Total time, 3 hours and 6 minutes; time at 5 landings, 20 minutes; making running time, 2 hours and 46 minutes.

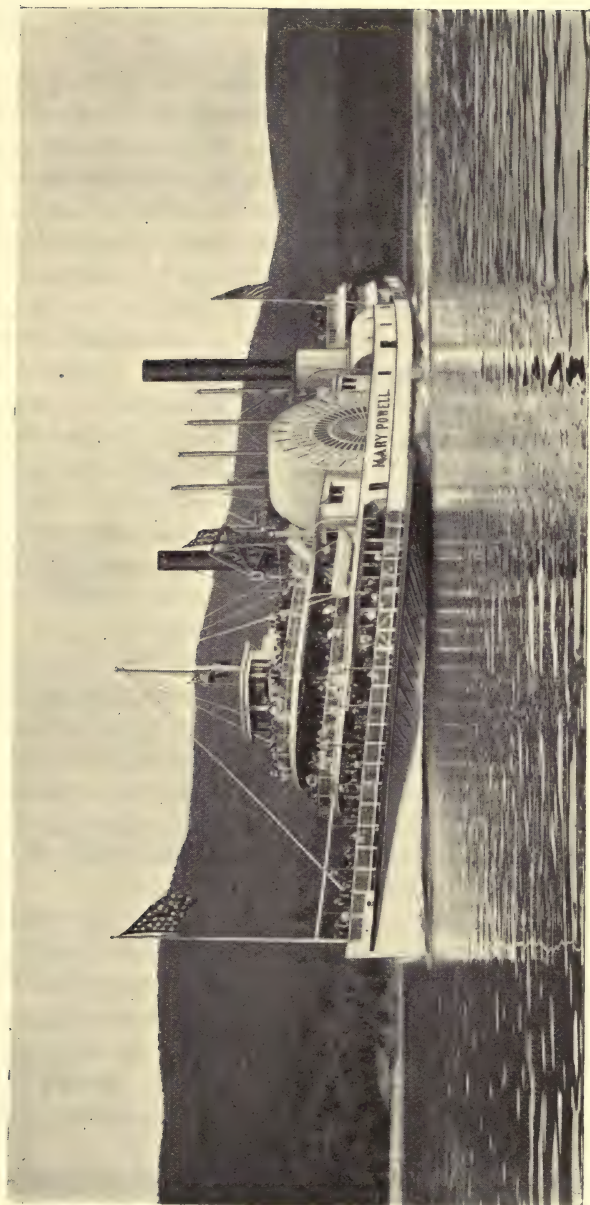
*The United States Steamboat Inspectors at Philadelphia, Pa., reported the following details of the "Thomas Powell," while running on the Delaware River: Hull, 231'2x28'11x9'x5'6 draft. Two iron boilers. Beam engine, 48" cylinder by 11 feet stroke. Pressure of steam, average at boiler, 41 pounds, cutting off at half stroke. Average revolutions, 22. Water wheels, 30 feet by 9 feet face. Main shaft, 12¾ inches at journal. Consumption of coal, 2,500 pounds per hour.

After the Hudson River Railroad was completed to Albany in 1851, and, in fact, for a year or more prior to that event, passenger travel by the river began to fall off and the number of steamboats, especially to the way landings, began to grow less in number. In the former year (1851) the "Thomas Powell" was taken off the New York & Erie Railroad, or Piermont route, and run from New York to Poughkeepsie for a time, but was subsequently sold to run on the Delaware River with the "General McDonald," from Philadelphia to Cape May. In 1856, the vessel passed into the possession of Captain A. L. Anderson and was run from New York to Poughkeepsie and, later, New York to Rondout. After the building of the "Mary Powell" the vessel passed into other hands and a few years later was running to Catskill, and later was on the Troy line, and finally was broken up at Port Ewen, in 1881.

After the "Mary Powell" was built in 1861, the landing was served as usual in the morning on her trip from Rondout and return in the afternoon, and by the Albany day line from New York in the morning on the run to Albany, and in the afternoon to New York by the same line, as the present practice. In 1867, for a few months, the "Sunnyside" was running to Newburg and the principal landings to New York.

The Homer Ramsdell Transportation Company had built in 1886, at Philadelphia, Pa., an iron propeller for the passenger and freight service, named the "Newburg," and the next year the "Homer Ramsdell" was constructed as a consort to the former, at Newburg, which boats have since filled the night line to Newburg as the terminal. This line was one of those composing the Central Hudson Steamboat Company, of 1899. The Rondout line of night boats have made this a landing for many years. The "Homer Ramsdell" made a trip on Sunday, August 21st, 1887, from Franklin Street pier, New York, to Newburg in 3 hours and 9 minutes.

How long will it be before the New York Central & Hudson R. R. Company will have the controlling interest in all of the passenger and freight lines on the river, for the initial steps are believed to have been taken some years ago? Such objects are gained step by step without attracting much notice from those outside the charmed circle, by the quiet absorption of stock and a representative occasionally on the board of



"MARY POWELL."

directors. The first thing that is known is a change of controlling interest. It will come on the river in time.

SING SING AND TARRYTOWN.

In 1865 the Lower Hudson Steamboat Company was organized of residents along the east shore of the river as far north as Sing Sing, D. N. Barney being president of the company. In October, of that year, contracts were made for the building of the hulls of two side-wheel steamboats to serve the landings on the east side of the river above Yonkers and as far north as Sing Sing. This was an opposition on part of the route covered by the Nyack line. The contracts for the hulls of these vessels were given to C. & R. Poillon, and to Lawrence & Foulks, both of Brooklyn, N. Y., and were named "Sunnyside" and "Sleepy Hollow," respectively. The former was 247'6x35'4x9', while the latter was 249'x35'4x9'. The engines were of the lever-beam type, each 56 inches cylinder by 12 feet stroke of piston, and were built by Sam. Secor & Co., of New York City, from patterns used for steamship engines that were too heavy for a light-built river boat. This line commenced operations in the spring of 1866, making landings at Yonkers, Irvington, and Tarrytown with one boat, and covering same route but extending to Grassy Point with the other boat. Peekskill was tried for a time, but abandoned on account of shoal water. This continued during 1866 and until July, 1867, when the "Sunnyside" was taken off the route and run to Newburg and West Point—to New York in the morning—for the balance of the season, while the "Sleepy Hollow" continued on the route. The enterprise proving unprofitable, the boats passed into other hands, the "Sunnyside" being subsequently secured by Joseph Cornell for the Troy line, and the "Sleepy Hollow" ("Long Branch") being run to Sandy Hook in connection with the New Jersey Southern Railroad. The latter was afterwards used in the excursion business in New York waters, and was finally broken up about 1896 or 1898. The "Sunnyside" was sunk by being cut through by the ice while on the Troy line.

In 1867, 1868 and 1869, the "General Sedgwick," later known as the "Bay Queen," was running to the lower Hudson River landings, with the "Thomas Colyer," also at frequent in-

tervals. With the regular Nyack line serving many of these landings, there was no want of frequent communication with the metropolis. During the early part of the period above named there was the Lower Hudson Steamboat Company's line on the east side landings as an opposition to a part of the Nyack system that made lively times on this part of the river while it lasted, a portion of the time the latter had three boats daily on the lower Hudson to the different landings. Increased railroad facilities since then have changed the course of travel.

NYACK.

The earliest record of steamboats to Nyack would appear to be that of the "Orange," built at Nyack in 1834, and was in dimensions of the hull 136'8x22'9x7'4, with a "square" engine of 30-inch cylinder by 6 feet 6 inch stroke. Isaac Tallman was captain of this vessel for a long time, which run here for some four years. The "Rockland," built at Nyack, in 1830, was a smaller boat than the "Orange," being but 122'x16'x6'3, with one of those "saw mills," as they were sometimes called, or "square" engines, of 30-inch by 5 feet stroke, and run here at different periods up to 1840. The "Arrow" was built in 1837 by Lawrence & Sneed, of New York, for this route and run here from New York for several years. The hull dimensions of this vessel were 201'5x22'x8'6; draft of water, 4 feet 6 inches, with a beam engine 31-inch cylinder by 11 feet stroke. When first built the vessel was about 160 feet long, but was subsequently lengthened. This vessel was rebuilt in 1857, and the power increased to a 40-inch cylinder, and named the "Broadway."

In 1850 the "Isaac P. Smith" was built at Nyack of about the same dimensions as the "Arrow" was originally, but with more power. This vessel run to Nyack until after 1864. Was destroyed by fire while lying at West Haven, Conn., October 25th, 1873.

The "Peter G. Coffin" was built in 1852, at Keyport, N. J., and was near the same size as the "Isaac P. Smith," but with less power, having but a 34-inch cylinder and 10 feet stroke of piston. This vessel was purchased in 1861 and continued on the route under her original name until 1871, when the hull was rebuilt and lengthened 20 feet, and the power of engine

increased to a 42-inch cylinder, and name changed to "Alexis," and in 1879 was again rebuilt and name changed to "Riverdale." It was under this name that the vessel made her last trip, for on August 27th, 1884, while on her way to Nyack and but a mile or so from her pier, one of her boilers exploded, blowing a hole in the bottom of the vessel and causing her to sink in a few minutes, resulting in the loss of several lives.

The "John Faron" run to Nyack in 1858, but for not a great length of time. This boat was built in 1856 by Lawrence & Sneed, was 147 feet long and fitted with a beam engine 36 inches by 8 feet stroke, built by John & Edward Faron, and a Blanchard boiler that was designed to mix steam and hot air for power with a view to economy, but, like other experiments along the same line, was found more costly than useful, and financially ruined one of the backers of the enterprise. The vessel was partially destroyed by fire on September 20th, 1859, was subsequently rebuilt and a simple steam boiler fitted in the vessel in place of the Blanchard boiler; was in the employ of the government as a transport during the war, and in 1866 came North to enter the merchant service, and her name changed to "Minnie R. Childs," and later to "St. Nicholas." She went out of service about 1885.

From 1867 the "Adelphi" ("City of Albany") run on the route until 1877, when the company to which she belonged, having become financially involved, the vessel was sold to R. Cornell White, of New York, who run her to Norwalk, Conn., for several years. While engaged in that business on September 28th, 1878, the boiler of this vessel exploded, while on a trip to New York, caused by the want of proper bracing to the boiler. There were 15 lives lost and the same number injured. Her name was subsequently changed to "City of Albany," and she was destroyed by fire October 7th, 1894, while lying in the Harlem River, being out of commission.

After the "Arrow" was rebuilt as the "Broadway" in 1857, the fates appeared to be against her and her reputation was not of the best. Her disposition was brought about by an explosion of her boiler on August 5th, 1865, when off Twentieth street, New York. Fortunately, compared with other accidents of the line, there was but one life sacrificed on this occasion. The engine, or part of it, was placed in a new hull con-

structed in 1865, and, when completed, named "Chrystenah." When the old company's effects were disposed of, this vessel was sold with the "Riverdale" to Alexander M. C. Smith, of New York, who continued to run these vessels on the Nyack route until the "Riverdale" was sunk in 1884, since which time the "Chrystenah" has been the only passenger boat to Nyack and way landings to Peekskill. There has been a propeller named "Raleigh" in the freight service.

Prior to the opening of the Hudson River Railroad, it was claimed that the railroad could never maintain the competition it must meet from the steamboats, but during the first season the road opened its lower end an account was taken of the passengers that left by the boats at the stations below Sing Sing for six days in succession, and it was found that the road carried about five-sixths of all the passengers, though the fare was about 40 per cent. greater by the railroad than by steamboat. At Peekskill the railroad fare was 55 cents, and the boats first charged 37½ cents and then fell to 25 cents, but they received so small a share of the travel that in a few days they generally abandoned the service and left the business of transportation of passengers and freight to New York to the railroad.

The Smith Bros., who controlled the water transportation from Nyack for many years, were Isaac P. Smith, David D. Smith, Abram S. Smith and Tunis D. Smith. Their first vessel was the "Arrow," and the last was the "Chrystenah," covering a period of over forty years in catering to the public travel from that landing.

NEW YORK TO PIERMONT, N. Y., N. Y. AND ERIE R. R.

The New York and Erie R. R. was opened for passenger travel as far as Goshen, N. Y., on September 21st, 1841, to Port Jervis, in January, 1848, and to Dunkirk, N. Y., on Lake Erie, June 15, 1851. The affairs of the company had passed through more than one crisis in that time, and had been under the management of three or more different interests during that period. The water service of the company at the eastern terminus of the road was performed for the first year or two by the Nyack steamboat "Arrow" stopping at Piermont for passengers, and in 1843 we find the "Robert L. Stevens" had been taken from the Saugerties route and was in the service

of the Erie Railroad Company. The freight for the railroad was loaded on barges that were towed by the passenger steamboats to Piermont. In 1844, the "Eureka," built in 1840, of 400 tons, was in the employ of the company, and in 1845 and again in 1847 the "St. Nicholas," a vessel built in the former year, of 180 feet long and a fairly good boat for speed was also on the route. The "Santa Claus" was also chartered by the company for a time, but not long, as she could not be spared from the excitement due to the opposition on the Albany through lines. In 1846, the "Arrow" was stopping again at Piermont for passengers. In 1848, the "New Haven," one of Commodore Vanderbilt's old Long Island Sound steamboats, was in the employ of the company. In 1849, the "Erie" x "Iron Witch," the property of M. O. Roberts and others, the former at a later period one of the directors in the railroad company, was running as a passenger boat. In April, of the same year, the "Thomas Powell" was bought by the company and the next summer was running with the "Erie," and this continued until April, 1851, the former being subsequently sold and taken to the Delaware River. The "Erie" then continued the passenger service alone until the "Francis Skiddy," in November, 1853, was also placed on the route, having been most elegantly fitted up for the purpose of attracting travel by that line, as the competition for the through travel to the West with the railroads forming the line from Albany to Buffalo at this time was very sharp. The "Francis Skiddy" did not remain on this route after June, 1854, the controlling interest in the vessel having changed hands. The "Erie" was then the only passenger steamboat on the Hudson River in the service of the company up to the time the trains run into Pavonia. The "New Haven" run all this time in transfer of freight, but occasionally for passengers.

The New York and Lake Erie R. R. Co., being lessees of the Long Dock Company, obtained control of the charter for the Pavonia ferry that was incorporated in 1849, and opened the ferry to Chamber street for travel, May 1st, 1861, with two ferryboats from Williamsburg ferry that they purchased in May and July, 1861. They were the "Niagara" and the "Onalaska," each being 130'x32'x11'. The ferry to Twenty-third street, New York, was opened May, 1868.

CHAPTER III.

NEW JERSEY.

NEW BRUNSWICK AND AMBOY.



HEN Fulton and Livingston obtained the monopoly of the waters of the State of New York they held control of all the transportation by steam vessels from the adjoining States into the waters of New York State. Then the steamboat controversy commenced. It was on the route from Elizabethtown to New York where the contest first took shape, but was later carried into effect on the New Brunswick route.

The first steamboat that was in operation in New York waters after the "Clermont" was the "Raritan," built for John R. and Robert J. Livingston, by Charles Brown, builder of the "Clermont." This does not take account of the "Phenix," for a few weeks, in 1809. The "Raritan" was constructed in 1808-9, and run from New York to landings on the Raritan River, making connection at New Brunswick by stages to Trenton, there connecting with the "Phenix," that run from Trenton to Philadelphia. The latter city at this time was one of much importance, both commercially and politically, and the new line had good prospects for the travel between New York and that city.

The enrolment of the "Raritan" at New York Custom House is No. 174, of July 6th, 1809, in the names of John R. Livingston and Robert J. Livingston, both of New York. Builder, Charles Brown. The dimensions were, "length 124 feet, breadth 21 feet, depth 6 feet 8 inches, and of 163 93/95 tons; square-sterned steamboat, has a round tuck, no quarter galleries, and an eagle figure-head."

The vessel began her service on June 8th, 1809, and made the trip from New York to Amboy in 4 hours. Landings were made at Elizabethtown, Amboy and New Brunswick. The passenger fare was 4 shillings to the former landing, 8 shill-

ings to Amboy, and 12 shillings to New Brunswick. Three round trips were made a week. This vessel was not so large as the "Clermont," but had some improvements in construction and fittings over the latter, and cost twenty-six thousand dollars. She was on this route as late as 1818, for in that year it is found the front head of the boiler blew out from weakness of the braces and scalded the engineer so badly that he died from his injuries. This is the vessel that Aaron Ogden tried to drive, in 1814, from the waters of New Jersey by legal proceedings, because Fulton and his associates would not permit him to run his steamboat in New York waters. The monopoly also had the "Olive Branch," in 1818, on this route, a vessel larger than the "Raritan." She run here until 1822, when taken to the Hudson River for service.

One of the through stage lines advertised as follows regarding the steamboats of this period: "The steamboat, or rather "smoak" boat advertises to travel more expeditiously than any line except the mail. We therefore beg leave to inform the public that they leave New York before we do, and do not arrive in Philadelphia until our passengers have had a comfortable refreshment, if then; and the fare and the expenses on the road are nearly double to ours. We do not do this to injure their establishment, only to make them *stick to the truth.*"

Another advertiser tries the poetical strain:

"Since steamboats are no more the rage,

We'll introduce our new mail stage;

As going by steam is out of date,

Pray take your seats ere 'tis too late."

Wonder what that stage owner would think of the trolley cars of this period? We just begin at this late day to think steam is out of date in some applications.

The steamboat "Atalanta," belonging to Aaron Ogden, ran to Elizabethtown, in connection with a line of stages to Philadelphia, as an opposition line, for a few years.

In 1818, Thomas Gibbons entered the field with the "Belona" and the "Atalanta." It was at this time that Cornelius Vanderbilt began his steamboat career. He had for several years before this been running small sailing vessels, called periaugers, between New York and Staten Island on his own

account. The first periauger enrolled at New York in the name of Cornelius Vanderbilt was the "Dread," on January 24th, 1816, of 49'x14'5x4'4. Builder, James Day, of Norwich, Conn. The next was the "Governor Wolcott," in July, 1817, being 49'x13'x4', by the same builder; and the "General Armstrong," on July 1st, 1818, by the same builder, with dimensions of 50'x13'x4'6.

Cornelius Vanderbilt was made captain of the "Bellona," and subsequently was superintendent of the line until Gibbons disposed of his interest in the line to the Stevens brothers. During the early days of the opposition, Gibbons, to get around an injunction that was placed on his boats running in New York waters, run them to the mouth of the "Kills," and there exchanged passengers to a ferryboat that ran from New York to Staten Island. He was enjoined at a later date, and his boats now made landings at the Hackensack bridge, just west of Jersey City Heights, his passengers from New Brunswick and way landings being transferred to stages that ran to Paulus Hook ferry, to New York. These makeshifts did not last very long at any one time. At one time he got so bold as to run direct to New York City, but that was soon stopped. All this time the main law suit was moving on, and it kept the opposition thinking all the time how to land their passengers in New York City with the least inconvenience. Vanderbilt with his perseverance and dash, and Gibbons with his dogged obstinacy, made a pretty hard pair to overcome as an opposition. In 1820, they announced: "The Old Union line via New Brunswick, Princeton, Trenton, and Bristol, 35 miles land carriage. Fare through, \$5.00. The Vice-President's steamboat 'Nautilus,' will leave New York every day—Sundays excepted—from Whitehall wharf at 11 a. m., for Staten Island. From here the passengers will be received into the superior and fast-sailing steamboat 'Bellona,' Captain Vanderbilt, for New Brunswick, from whence in post chaises to Trenton, where they lodge, and arrive next morning at 10 o'clock in Philadelphia by the commodious and fast-sailing steamboat 'Philadelphia,' Capt. Jenkins, in time to take the Old Union line Baltimore steamboat." X

John Stevens had all this time been running the "Phenix," and later the "Philadelphia," on the Delaware River in connec-

tion with the "Raritan," and later the "Olive Branch," but in 1820 the Old Union line formed, and Gibbons' line to Raritan River, making connections through the stage line to Trenton with the "Philadelphia" of Stevens' line. The connecting stage lines were a part of the Old Union line. It will thus be seen that the Monopoly and Stevens' connection had been broken. The "Olive Branch" now run in connection with the "Etna" and the "Pennsylvania" on the Delaware River as the Columbian Steamboat line, and a merry war was inaugurated that continued until the withdrawal of the Old line. There was toward the last another opposition line in the fray, to make it more interesting. Whether that was a Gibbons and Vanderbilt move to hasten the departure of the Old line there is no telling. Vanderbilt was good at it in later years. The principal lines were both backed by men of ample capital for the enterprise, and the business was carried on with a spirit to drive off all opposition, but they all fought with a grim determination to the end.

After the decision of the Supreme Court of the United States in 1824, the service on both rivers was much improved by the addition of more modern and larger vessels, so that when the Gibbons' interest was acquired by the Stevens brothers they had a good fleet of vessels for the service at that day. Gibbons had built the "Thistle" in 1824 and the "Swan" in 1826.

After Gibbons had withdrawn from the line, Vanderbilt, in 1829, placed an opposition boat on the New Brunswick route named "Citizen," against the Old Union line, and gave them a lively time for a year, cutting down the through fare from \$4.00 to \$2.00, that was met by the regular line at \$1.25. He advertised at the time: "Travelers by the Despatch line can be comfortably accommodated, avoiding the pressure of a crowd of ten-shilling passengers." This is altogether probable the first of his steamboat enterprises on his own account. He was now thirty-five years of age. About 1830 he came into possession of the steamboat "Bellona," that he commanded while in the Old Union line. The model of this vessel is in one of the offices of the Grand Central depot of the New York Central R. R. Company at New York City. The vessel was 102 feet over all, 22 feet 11 inches beam and 7 feet hold.

Amboy had been used as a terminal by none of the lines permanently up to 1830, except the Monopoly line used it for a short time as a trial for an advantage when hard pressed by the outsiders. Then they made their connections by the way of Bordentown.

X The Union line, that had obtained control of all opposition lines in 1830, was merged into the Camden and Amboy R. R. Company soon after its organization. The railroad was opened for travel in 1832, but prior to this the boats had been running to Amboy. X Subsequently, the "Independence," that had been in the passenger business on the Hudson River, was bought and rebuilt for this route, and was followed by the "New Philadelphia" for a time. This latter vessel was the one Robert L. Stevens made so many experiments on, both with hull and engine. There was also the "Napoleon," a boat of 130 feet keel, that during her whole career was always in the thick of a tumult of opposition. The owners always seemed to be looking for business, and generally found it.

The "Antelope" commenced running to New Brunswick in August, 1847, and at a later date, having been sold and sent to the Pacific coast, her original owners had the "Reindeer" built for the New York and Raritan River service. She run here but a few trips, and for a few months from New York to New Haven, Conn., and during the next year was on the Hudson River, where she remained until destroyed by fire.

During the early fifties the "Trenton" left New York at 10 a. m. for Amboy, cars to Bordentown, thence by "Richard Stockton" to Philadelphia. Express service by "John Potter" at 2 p. m. for Amboy, thence to Camden by rail. Through fare, \$3.00.

The "John Neilson," built in 1849, by the Stevens brothers, also run to Amboy and New Brunswick. This boat was an experiment for the purpose of testing by blowing engines to drive a current of air in two channels under the hull of the vessel, hoping thereby to reduce the frictional surface of the wetted skin of the hull, lessen the draft of water, and to increase the speed. The stern of the vessel was built similar to that of a scow. The effect of driving the air under the hull

while under way, with the bad model of the vessel, was to make a great swell and commotion of the water and to cause the washing of small boats on shore and throwing of high waves over the ends of the piers, so great was the force imparted to the water. It is believed the shape of the vessel under water was responsible for part of this commotion. No permanent benefit seems to have been gained from this experiment. The hull of the vessel has been in service for many years as an excursion barge.

In 1852, the "Richard Stockton" was built by the Harlan & Hollingworth Co., and was one of the early iron-hull river steamboats of large size. She had a beam engine 48"x12'. After running for a time on the Delaware end of the line was brought around to run to Amboy, being the property of the Camden and Amboy R. R. Company. This vessel run here for many years, and was one of more than average high speed. Her paddle wheels were of iron, with iron buckets about 13 feet long. About 1875 the vessel was placed in the excursion business, for the passenger line to Amboy had now been withdrawn. In 1893, the vessel was given in part payment for a vessel built by John Dialogue, of Camden, N. J., for the Pennsylvania R. R. Company.

In 1865, the "William Cook" was built and fitted with the "John Neilson's" engine. This vessel was constructed expressly for the Long Branch service, and was intended to be of high speed, but it is doubtful if, in the long run, she obtained as good an average as the "Richard Stockton." The frame of this vessel was of very light timber. About 1874 she was sold to Thomas Cornell for a milk route from Rondout, and was worn out in that service. The "Trenton" was retired in October, 1865, and "John Neilson" in November, 1865.

The Camden and Amboy R. R. Company and the Delaware and Raritan Canal Company both received their charters from the State of New Jersey on February 4th, 1830, and were at first controlled by rival interests. Prior to the formation of these companies and during the public discussion of the prospective building of the railroad and the canal across the State, the canal interests were aided by the People's line

as well as other opposition lines of steamboats on the Delaware River, on account of the railroad interests being in the same hands as controlled the Union line of steamboats on the Delaware River. When the promoters of the railroad showed a bold front and a purpose to obtain a charter to construct the road, the opposition raised the cry of "a monopoly in transportation across the State" held by the Union line. But this soon died out, and the companies were subsequently united under the so-called "Marriage Act" of February 15th, 1831.

The canal charter was for a period of fifty years, and contained a provision "that no canal should be constructed within five miles of the canal and feeder without the consent of the company." There was also a provision in the railroad charter, that was for thirty years, "that the State should not authorize the construction of any other railroad across the State from New York to Philadelphia which shall commence and terminate within three miles of the commencement and termination of the road authorized by this act." This monopoly or exclusive privilege was not included in the original charter granted in 1830 to the railroad, but was subsequently obtained when the State became interested in the railroad, and by an agreement on the part of the railroad corporation to pay in lieu of taxes to the State ten cents for each passenger passing over the State on their railroad, and fifteen cents a ton for all merchandise transported by them. These charges were not to be paid until the railroad was earning dividends on its operation. The State thus became an interested party in the successful operation of the railroad that was for several years an important link in passenger and freight transportation between Washington and Philadelphia on the south, and New York and the Eastern States on the north. Its income from all foreigners (residents of other States) passing over the road, through the excessive passenger rates charged, as well as the high freight charges demanded by the railroad, was a matter of no small moment for the State Treasury for a long period of years. For many years the power of these companies in the politics of the State was a matter of national reputation. Fulton's monopoly of the waters of the State of New York would

appear to have been more equitable than the privilege granted to this railroad across the land of the State.

X The railroad was completed from South Amboy to Bordentown in December, 1832, and to Camden in 1834. The canal was completed in 1838. X

DELA
RARIT

The first board of directors of the Camden and Amboy R. R. Company included Robert L. Stevens and Edwin A. Stevens, of Hoboken, N. J.; J. H. Sloan, of Camden; Abraham Brown, of Mount Holly; William McKnight, of Bordentown; William I. Watson, of Philadelphia; and Benj. Fish, of Trenton. Those of the Delaware and Raritan Canal Company were James Neilson, of New Brunswick; James Parker, of Perth Amboy; William Halstead, of Trenton; G. D. Wall and James McIlvaine, of Burlington; James S. Green, of Princeton; with Robert F. Stockton, of Princeton, as President.

Prior to the expiration of the original charter of the railroad they obtained an extension of their original grant to January 1st, 1869. In 1867, the New Jersey R. R. and Transportation Company, running from Jersey City to Trenton, was consolidated with the above companies under the title of "The United N. J. R. R. and Canal Co.," and in May, 1871, the railroad and canal were all leased to the Pennsylvania R. R. Co. for 999 years. These original companies were almost wholly owned and controlled by residents of the State of New Jersey.

The last passenger service by boat to South Amboy was by the "William Cook," making one trip daily in connection with a way train to Philadelphia as late as July, 1872. The "John Potter" and the "Joseph Belknap" run as passenger and freight boats, and the "Transport," "Amboy," and "New Philadelphia" as freight boats.

There were several large side-wheel tow boats of the Camden and Amboy R. R. Co., at this period, that were built expressly most of them for the purpose of towing the freight barges and carrying freight themselves, and among the fleet were the "Princeton," "Bordentown," "Weehawken," and "New Philadelphia." The distinguishing feature of these vessels were the enormous wheel houses they had, in fact, it seemed as though the "Princeton" was all a wheel house, her water wheels being each 40 feet in diameter. These boats were

about 180 feet long, and had beam engines, 54 inches by 10 feet, excepting the "Princeton."

Of late years there has been running to New Brunswick the "G. T. Olyphant," and in 1877 the "Wyoming," that had formerly run to Elizabethport in connection with the New Jersey Central R. R. This boat was laid aside in 1880 and the engine placed in a new hull named "New Brunswick." The latter vessel was destroyed by fire in the Raritan River on August 7th, 1902.

KEYPORT.

The communication between New York and Keyport by steamboat was opened in 1836, by the steamboat "Monmouth," belonging to the Steamboat Company of Middletown Point, built in that year at Baltimore, Md., by Rogers, Brown & Cully, who built the steamship "Natchez" about that time. The "Monmouth" was 124'x18'6x8'7, and fitted with a square engine. The vessel run here for a few years and was followed by the "Hope," a smaller vessel with same type of engine, then by the "Rockland," built in 1830, and in 1848 by the "Joseph E. Coffee" for about two years. Afterwards, the "John Hart," the "Ocean Wave," and the "Golden Gate" run at various periods until 1853 or 1854. The "Chingarora," the largest vessel that had run on this route up to 1850, was in service here for a time, was then sent south, where she was destroyed by fire; was sold in March, 1851, to run between Mobile and New Orleans. The engine was brought to New York and put in the "Keyport" when built in 1853. At this time Keyport began to develop mainly through the construction of the Florence & Keyport plank road: and another important factor was the monopoly held by the Camden & Amboy R. R. Co., of the railroad transportation across the State of New Jersey.

In 1853, the Keyport & Middletown Steamboat Co. was organized, and during that year the "Keyport" was constructed for them at that place. This vessel run here until chartered for a despatch boat on the Potomac River, in 1862, by the Army Department, and was shortly after sold to the Potomac Steamboat Co., who had her under charter several times during the Civil War. Subsequently, the vessel was brought back to New York waters, and in 1885 her name was changed to "James T.

Brett," and for many years has been running on the lower Hudson. The "Keyport" commenced running in 1853, and with the "John Hart" and the "Eagle" for a time, there were ample accommodations for the landing, with three boats daily, during which time passenger fare fell to as low as twelve and one-half cents. The "Armenia" run a portion of this season as a morning boat from New York by the way of the "Kills."

In 1862, the "Matteawan" was built for the same company and continued on the route until 1880, when sold to J. H. Starin, when the old company retired from business, as the railroad had cut into the business so much. The "Minnie Cornell" was built during the same year at Athens, N. Y., for Joseph Cornell, of Rondout, N. Y., and fitted with an engine taken from the "New Champion," that had been on the Hudson River. This vessel run on the route until destroyed by fire at Keyport, on March 27th, 1893. Since then the "Magenta" has served the route for a portion of the time.

After the "Keyport" went to the Potomac River, and before the "Matteawan" was completed, the "D. R. Martin" and the "T. V. Arrowsmith," at different times, filled her place. The "Keyport" and the "Matteawan" were both, when on this route, very able boats, and it is very doubtful if there was any steamboat during the period they run through the Narrows that was able to cope with them, unless it might have been at one time the "William Cook," or the "Jesse Hoyt."

There has been running from Matteawan, that is a short distance from Keyport, a line of freight propellers for many years.

"Keyport," 184'x28'6x8'; beam engine, 40"x12'.

"Matteawan," 206'x27'8x10'; beam engine, 44"x12'.

"D. R. Martin," 207'x31'x9'; beam engine, 53"x10'.

"T. V. Arrowsmith," 201'x28'6x8'7; beam engine, 44"x10'.

SANDY HOOK LINE OF THE NEW JERSEY CENTRAL RAILROAD.

The present line running to the Atlantic Highlands was the outcome of the building of the Raritan and Delaware Bay R. R., or, as later known, the New Jersey Southern R. R. This road was started in 1860, by the construction of five miles of the road from Port Monmouth, on the shore of Sandy Hook

Bay, about midway between Keyport and the Highlands. Before the construction of the railroad, a wharf had been built at Port Monmouth, and a steamboat named the "Eagle," and a propeller named the "Argus" had run to New York. After the railroad had begun operations, the "Alice Price," that had been running to Red Bank, was run in connection with the railroad to New York until September of that year, when the "Taminend" took her place until the following summer; then the "Naushon," followed by the "Aurora," continued the service until the "Thomas Collyer" x "Antelope," and later "Twilight," began running on the route that ended during the latter part of the year 1862. In 1863, the "Jesse Hoyt," that had just come from the New York and Glen Cove route and had her name changed to "J. D. Beers," and shortly after changed to the original name, commenced running in connection with the railroad, and, up to the time of the removal of the termini of the railroad to Sandy Hook, had as consorts on the line, at various times, the "Wyoming," the "Magenta," the "Neversink," the "Nelly White," the "Josephine," and some others. The "Jesse Hoyt" was one of the few boats not on the Hudson River that had her engine placed in the vessel with the shaft forward of the cylinder, though she was originally built for the upper Hudson River route. In 1862, seventy-three miles of railroad had been constructed to extend from the Port Monmouth branch.

In 1864, the Camden & Amboy R. R. Company still having the monopoly in carrying passengers and freight across the State of New Jersey, compelled the Raritan & Delaware Bay R. R. Company to change their termini from New York to Brooklyn, in running in connection with through trains to Philadelphia. The fare was reduced from New York or Brooklyn to Philadelphia to two dollars for several months. The purpose was to stop the boats making a connection to the lower New Jersey points. But the boats still run and made the connection with the railroad.

When the New Jersey Southern R. R. Company was organized out of the Raritan and Delaware Bay R. R. Company, in 1869, and had purchased the Long Branch and Sea Shore R. R. from the Edwin A. Stevens estate, the latter road was extended from Spermaceti Cove to a deep water termini at

the Horse Shoe on Sandy Hook. The original owners of the Long Branch and Sea Shore R. R. had built and run the "William Cook," and at times the "Richard Stockton" and "River Queen" from New York to the termini of the railroad for about four years prior to its sale.

When the terminus at Sandy Hook was ready for use in June, 1870, James Fisk, Jr., who was the controlling spirit in the Narragansett Steamship Company, and was one of the principals in its organization, and was the means of the absorption of the Fall River line at that date, had the "Plymouth Rock," "Metropolis" and "Empire State" and some others on his hands as idle boats. He made an arrangement with the New Jersey Southern R. R. Co. to cover the water service of the route and fitted out the "Plymouth Rock" in elaborate style for the passenger travel, and razeed the upper works of the "Metropolis" and laid tracks on her deck to transfer freight cars. These boats, with the "Jesse Hoyt" and the "Long Branch" x "Sleepy Hollow," performed the service under the Fisk and Gould management for three years and eight months, when Fisk having died, the line was abandoned.

From early in 1874 until 1879 the New Jersey Southern R. R. and Steamboat line was operated by the trustee of the first mortgage bondholders, ex-Chancellor Benj. Williamson, with William S. Sneden as general manager. The steamboats operated during this period were the "Jesse Hoyt," continuously, the "River Belle" in 1874, until destroyed by fire at her dock in New York on September 3d—the hull is now the barge of the St. John's Guild, of New York—the "Jane Moseley" in 1874 and 1875, with the "Day Star" in the latter year, and the "Crystal Wave" in 1875, 1876 and 1878, and the "Empire State" in 1877. The "Jane Moseley" was built by Lawrence & Foulks in 1873, for the Long Island R. R. Co., to run from Greenport to Newport as a connecting link of a through line from New York to the Eastern States, but it was abandoned after a short time. The "River Belle," the "Day Star" and the "Crystal Wave" belonged to the American Steamboat Co. of Providence, R. I. They were all boats of over 200 feet long, good accommodations and with ample engine power. The "Plymouth Rock" was taken to Boston, Mass., in September, 1886, and broken up as old junk.

After the New Jersey Southern R. R. passed under the control of the Central R. R. Co. of New Jersey in 1879, the latter company refitted one of their large ferryboats, the "Kill Von Kull," in good style, to run on the Sandy Hook route. The boat proved to have too little power to make the time required, and, after running one season, was withdrawn. This vessel was destroyed by fire at Elizabethport March 3, 1889. The "Cape Charles," that had run on Delaware Bay, in connection with a railroad from Cape Charles to Norfolk, Va., and the "City of Richmond," that had seen service on the Delaware River, was run with the "Jesse Hoyt" until the "St. John," in 1879, was chartered and subsequently purchased from the Commercial Navigation Co., who had run her from Charleston, S. C., to Jacksonville, Fla. These two boats continued the service until the "Monmouth" was built in 1888, when the "Jesse Hoyt" was laid aside, and during the next year the company had built the "Sandy Hook" as a consort to the "Monmouth," since which time the two fine twin-screw propellers, the "Monmouth" and the "Sandy Hook," with the side-wheeler "St. John," have filled the water service to the Atlantic Highlands, to which the railroad terminus was changed in 1892. A new vessel for the line has lately been placed on the route, named "Asbury Park," but from all appearances she has not come up to the expectations in regard to speed thus far.

The "Jesse Hoyt" was 239'x29'7x9'2, with beam engine, 56"x12'. The "Jesse Hoyt" was originally 219'x29'x9', with a beam engine 46"x12'.

"St. John's" was 250'x38'x14', with beam engine 66"x12'.

"Monmouth," 260'6x35'x14', with two triple-expansion engines each; cylinders 19" and 30" and 50"x30". Vessel and machinery constructed by Wm. Cramp S. & E. B. Co.

"Sandy Hook," 260'6x37'x14'3, with two triple-expansion engines each; cylinders, 22" and 35" and 55"x28". Vessel and machinery constructed by Harlan & Hollingsworth Co.

After the railroad terminus was changed from Port Monmouth to Sandy Hook, the residents of the former place had at times a small steamboat to transport their freight to market, and in 1880 a side-wheel boat was built named the "Wm. V. Wilson," for the service which was maintained to a few years ago. There was also running here in 1870 a small stern-

wheeler named "Orient," built at Cape Elizabeth, Me., in 1865, and was 121'7x21'6x5'8 deep, with two high-pressure engines, each 15 inches by 5 feet.

RED BANK AND SHREWSBURY.

X The first steamboat to run regularly to Red Bank after the "David Brown"* was the "Frank," built by James P. Allaire in 1834. She continued to run from New York for about three years. Then the "Osirris," built in 1838 by Bishop & Simonson for the same owner, made Red Bank her landing. She also run to Cranberry, N. J., for a year or more. X

The Monmouth Iron Works was opened in March, 1815, by Shippan & McMurtrie, of New York City, to manufacture stove castings from the bog-ore in the vicinity. In 1822, J. P. Allaire bought this furnace that was located near the present town of Allaire, N. J., and in 1828 he was the principal organizer of the Howell Works Co., where was manufactured hollow ironware, sadirons and other cast-iron wares on a very extensive scale, and in 1831 had 400 men employed at these works. Three years after the organization of the company, Mr. Allaire was the sole owner of the stock of the company. It was successful as a furnace until about 1840, when anthracite iron began to be successfully made, but the other departments of the works were run until 1850. The steamboats were employed in transporting the manufactured product from the works to New York. The "Osirris" run until 1842, when the "Orus" was built for the same owner. The latter vessel was larger, being 135'x21'x7'8, with two beam engines, each of 25 inches cylinder by 8 feet stroke. This vessel run to Red Bank until 1850, when sold to parties who sent her to the Chagres River before the building of the Panama railroad and the time of the gold excitement in California. There was also in the early forties the "Frank," from the Hudson River, and of about the same size of the "Orus," being run in the same interest as the other steamboat on the route.

The "Edwin Lewis" was an opposition boat, while the "Orus" still was running on the route to Shrewsbury River, and was serving the route as late as 1855. In 1853 the

* See "David Brown" in *Coastwise Steamers*.

"Thomas Hunt," then a new boat and larger than any that had preceded her on the line, except the "Confidence" that was run to Red Bank the previous season, but found to draw too much water for the Shrewsbury River, and the "Thomas G. Haight," a smaller boat, and the "James Christopher," of about the same size, the latter being 145'x25'x7'6", with a beam engine 28 inches by 8 feet stroke. This latter vessel was subsequently known as the "Long Branch," and was chartered by the Quartermaster's department in the early part of the Civil War from George H. Power, and left her bones on one of the Southern rivers. The "Ocean Wave" and the "Golden Gate" were two more of the light-draft boats that run here prior to 1860, and were a few feet shorter than the "Hunt," but with much less power. The "Alice C. Price" was also one of the early boats on the route. The "Alice C. Price" and the "Thomas G. Haight" were sold at auction in 1855, the former for \$10,620, and the latter for \$13,600 to a company for use on the Potomac River. From 1856 to 1858 there was frequent communication with the Metropolis, and complaint could not be made about excessive rates of fare, for they were as low as twelve and one-half cents, and for months at a time twenty-five cents was the ruling rate on these lines. There was plenty of life then on the bay to the Hook.

In 1858, the "Highland Light" was built for this route, and was of about the same size as the "Thomas Hunt," the former having an engine 38"x10', and the latter one of 36"x11'. The "Highland Light" was under charter to the War department during part of the Civil War at \$350 per day, and toward the close of the strife another charter at \$150 per day. The vessel remained in Southern waters, and was employed on Chesapeake Bay until 1894, when laid aside from further use. The "Thomas Hunt," after running on almost every route within a short distance of New York, has found her way into Starin's excursion fleet, under the name of "Valley Girl." The "Meta" was also on the route for a time during the early sixties.

In 1866, the "Sea Bird" was constructed at Brooklyn, N. Y., for the Merchants' Steamboat Co. for the Red Bank route, and is the largest steamboat that has run to that landing. It is 187'x30'x8', with a beam engine 42"x10'. The vessel was partially destroyed by fire on May 5th, 1867, was rebuilt and on the

route again in July following, the "Nelly White" taking her place in the interval. The "Helen" was built for the same parties in 1862, but was a much smaller vessel, and run until the "Albertina" was built in 1882. The "Albertina" was originally 165 feet long, but subsequently was lengthened; has a beam engine 38"x10', and with the "Sea Bird" has filled the wants of the line for several years.

The shifting nature of the sand bars at the mouth of the Shrewsbury River has been an obstacle to the navigation of the two branches of the river by any but very light-draft steamboats, and these must time their arrivals and departures by the condition of the tide. Since 1871 Congress has appropriated about two hundred and fifty thousand dollars for the improvement of the channels, that has been expended mainly for dredging.

The first steamboat we find to the South River was the "Franklin," that run from New York to Shrewsbury near "Long Branch" in 1819 for a short time, three times a week stopping at Fort Diamond in New York Bay. Passenger fare 8 sh. This branch does not appear to have had any steamboat line for many years after, probably on account of Allaire's line of steamboats filling all the need for communication by water for that section of the State.

There was no steamboat running here until the "Edwin Lewis," about 1848. This was a small vessel of only 124 feet in length, like unto one of our harbor tugs, with very large power for her size of hull, having a square engine 29 inches by 8 feet stroke. They made it lively very often for the Red Bank boats in those days, as there was plenty of opposition on hand at frequent intervals. She run there for several years. The "J. G. Christopher" also run up the South branch.

After the completion of the New Jersey Southern R. R., or as then known the Raritan and Delaware Bay R. R., to and along the Atlantic coast in 1862, there were no steamboats running to the South River for many years. It was not until 1883, when the "Wilber A. Heisley," a stern-wheeler of the Western river type, was constructed at Nyack, N. Y., for a company composed of residents in the immediate vicinity of the Shrewsbury River. The vessel was 185 feet over all, 155 feet keel, and was fitted with two high-pressure engines, built

by James Rees & Sons, of Pittsburg, Pa., having cylinders each 18 inches diameter and 8 feet stroke. The stern-wheel was 24 feet diameter, with buckets 25 feet 4 inches long. There was fitted to furnish steam a water-tube boiler, built by Charles Ward, of Charleston, W. Va. This vessel run to the Shrewsbury River for a year or more, and having proved an expensive boat to run, the company closed up the business and the vessel was sold at sheriff's sale. Her name was now changed to "City of Long Branch." The vessel run again for about two more seasons to same points, and after an interval of a few years was placed in service between Philadelphia and the towns on the upper Delaware River. She was afterwards chartered for a year by a wrecking company searching for a British treasure ship in the Delaware River. In 1892, she was sold to parties in North Carolina, and on November 3d, of that year, was destroyed by fire while on the Roanoke River. This was the largest stern-wheeler that had been on the North Atlantic Coast. The "Helen" was at one time a stern-wheeler, or partly so; and then there was a freight boat that run to Port Monmouth prior to 1870, but these were smaller vessels.

After the "City of Long Branch" was withdrawn, a side-wheel vessel was built for parties owning summer residences on the river, at Bath, Me., and named "Shrewsbury." This vessel was 161'x26'6"x7'6", and fitted with an inclined compound engine having cylinders 25 inches and 44 inches by 6 feet stroke. This was a well-built and serviceable vessel for the route, but was another expensive one to run, pretty much the entire hold of the vessel being filled with machinery. Not proving a success on the route, this vessel was in operation but one season, and after being laid up for several months was sold for service on Lake Ontario, where she has since remained under the name of "New York." One trouble with her operation on the waters of the South River consisted in the filling of the tubes of her surface condenser with the sand brought in by the water of condensation.

The present "Patten line" is the development of an interest Thomas Patten had in the steamboat "Pleasure Bay," built at Nyack, N. Y., in 1890, and that run to Long Branch and points on the South River. Two years prior to this the "Elberon" had been built at Nyack also, for the Merchants'

Steamboat Company, owners of the Red Bank line, and run to Shrewsbury and landings on the river. This boat had the engine and boiler of the "Helen," that had now been laid aside. An opposition now began between the two lines that was fierce and determined while it lasted, during a period covering nearly two years, and when it was over developed the purchase of the "Elberon" and the controlling interest in the "Pleasure Bay," by Thomas Patten, and subsequently the formation of the Sea Bright and Pleasure Bay Steamboat Company, with a capital of \$30,000. In 1893, the "Mary Patten" was built at Brooklyn, N. Y., for this same service, and has proved a very profitable boat for the company. In 1894, a company was organized of residents in that part of the State adjacent to the river, who had a vessel constructed at Tompkin's Cove, N. Y., of the dimensions of the "Pleasure Bay," and named "Little Silver," and after this steamboat was placed on the route there was a war of rates and all other factors that accompany an opposition line, that would have done justice to some of the earlier contests with similar weapons, and at its ending in about two seasons the Patten line owners were found in control of a majority of the stock of the opposition company. So the Patten line owns at this time the steamboats "Pleasure Bay," the "Elberon," the "Mary Patten," the "Little Silver," and their latest and largest of them all, the "Thomas Patten," and controls all the passenger business and freight by water from the south branch of the Shrewsbury River.

DELAWARE RIVER.

The first experiment with a steam vessel in this country was that made by John Fitch, in 1787, on the Delaware River, as detailed on another page. It was several years before a better steam vessel was seen on the river, but, in the meantime, such progress had been made in steam navigation that the question of a successful steam vessel was no longer in doubt.

The "Phenix," built by John Stevens, at Hoboken, N. J., and sent around to the Delaware River in June, 1809, is also mentioned on another page. There is a handsome oil painting of this vessel in the gallery of the late E. A. Stevens, at Hoboken, N. J., where the name Moses Rogers is painted in bold

letters across the paddle-box, this being a custom not uncommon in the early days, when the name of the captain was as well known as that of the vessel he commanded. This Moses Rogers was at a later date the captain of the American steamship "Savannah," that was the pioneer of the Atlantic Ocean steamers, and that sailed from Savannah, Ga., for the British Isles and Russia in 1819. After the "Phoenix," that did service on the river until about 1813, came the "Philadelphia," or "Old Sal," built at New York in 1815 and run to Trenton in connection with the stages from Amboy and New Brunswick, N. J., that made a through line from New York. Both of these vessels were about 140 feet long by 20 feet beam and drew about 4 feet of water. The engine of the "Philadelphia" had a cylinder 33 inches diameter and her water-wheels were 18 feet diameter. This vessel was laid aside in 1825.

There were two high-pressure boats built at Philadelphia in 1820, named the "Etna" and the "Pennsylvania," to run as opposition to the Union line. They were 120 feet long by 20 feet beam by 4 feet draft. They remained here but one or two seasons, when they were sent to New York waters. The "Pennsylvania" was a towboat on the Delaware River after 1840, belonging to the Lehigh Valley Coal Company. There were several opposition boats that tried their fortunes on the upper Delaware at this period and found it to be a poor investment, as the stage connections were in the hands of the regular line.

The Union line, in 1825, put in service the "Trenton," built at the Stevens yard at Hoboken, N. J., the year before, and was a vast improvement over the slow old tubs that had been the only means of communication by water between Philadelphia and Trenton for many years, and in 1826 the "Burlington," built at the Hoboken yard also. This vessel was originally about the same size as the "Trenton," but like the latter was subject to changes until the hull was 229'x23'x8' deep, with an engine 38-inch cylinder by 7 feet stroke. The "New Philadelphia" was also on the Delaware for a few seasons, running to Bordentown at the same time as the "Burlington," and the "Swan" of same dimensions generally as the "Trenton" was here for a few years. Most of these boats, after running a few seasons, were sent back to New York waters to

run on the Amboy end of the route. The "Rainbow," built in 1841, and after doing service on the Hudson River and not developing as high speed as anticipated, was sent to the Delaware River, and after some years went the way of many passenger boats—towing canal boats and coal barges. Every few years there would be some of the out-of-date and inferior class of passenger boats sent from the Hudson River to the Delaware River to run as opposition lines, or offer themselves up as a sacrifice to be bought off, prior to 1850, but after that date some fine passenger boats of independent companies were sent from New York.

The Camden & Amboy Railroad Co., the transportation monopoly of the State of New Jersey of this period, in 1845 built a fine side-wheel passenger boat with an iron hull, the "John Stevens," at the Hoboken yards for a passenger boat to Bordentown, but when about ten years old was burned at her dock at Bordentown on July 17th, 1855. This vessel was 245'x 31'x11 feet hold, with a "steeple" engine of 75-inch cylinder by 8-foot stroke. She was about the first, if not the pioneer, of our iron-hull steam vessels that was fitted with a collision bulkhead, in this case being 27 feet from the stem of the vessel. After being burned the machinery was removed and a pair of propeller engines erected on board and twin-screws fitted to the vessel, placed in the freight service of the railroad company, where she is doing duty to this day in New York waters, but of late years for the Pennsylvania Railroad Company.

The "John Neilson," with the blowing engines to blow air under the hull of the vessel, also run from Philadelphia in the passenger service of the Camden & Amboy R. R., at times, after 1850; and the "Joseph Belknap," from the New York end of the route, was on the Delaware. These were all pretty fast boats for the river, but none of them was the equal of the "Richard Stockton," built in 1852, and in the same service.

✕ The "Ohio," built in Philadelphia in 1832, and whose dimensions were 175'x25'x9', and the "Robert Morris," a smaller boat than the "Ohio," built in 1830, were for some years running to Cape May, both being owned by the Union line. In 1839, the "Linnaeus," from New York, was also running to Cape May. ✕ After 1840, the "Napoleon," from New

York, took a respite from the labors of the opposition in those waters and run as the disturbing element to the Cape. This was a small boat that was in the thick of the fight of opposition. In 1850, the "Balloon" and the "Rip Van Winkle," and, in 1851, the "Thomas Powell," all from the Hudson River, were on the lower Delaware River. The "Thomas Powell" and the "General McDonald," from Baltimore, Md., run to Cape May for about four years, when they were brought to New York. There was also at this period the "Manhattan," that had been on the Hudson River for some years, and was a passenger boat of good dimensions. Prior to 1880, there was the "Sue," the "T. V. Arrowsmith," from New York, and in 1878 the "Republic," the largest and best equipped vessel for the Cape May route that had been there to that date. This vessel was 270'x37'x12'6, with beam engine 66"x12'.

The first steamboat of any size to run to Wilmington was the "Wilmington," built in 1829, at Philadelphia, by S. Grice, for J. A. Bayard and others, and whose dimensions were 156'x22'x8'3, and had a beam engine, built by Thos. Halloway, of 38-inch cylinder by 7 feet 6-inch stroke. Six years later the vessel was lengthened and the engine enlarged to a 40-inch by 10-foot stroke, the ownership having passed to the Wilmington and Philadelphia Steamboat Company. During 1840, the vessel was sold to parties who started to take her south, but she was lost on the way. In 1836, J. Vaughan, of Philadelphia, built for Wilmon Whilden, Jr., the "Telegraph" for this service, a boat of 169'x22'6x8'9, having a beam engine, built by Thomas Halloway, of 36-inch cylinder by 10 feet stroke, and that run in connection with the Wilmington and Baltimore Railroad. Between 1845 and 1850 the "Napoleon" and the "Balloon" were at times putting in a season on the route.

In 1845, the "W. Whilden" was built by the Harlan & Hollingsworth Company for Capt. Whilden for this service, and her hull dimensions were 192'x19'7x8', with a beam engine of 40 inches by 9 feet. She run to Wilmington until about 1857, afterwards being altered to a propeller and placed on the Philadelphia and Baltimore route. In 1847, the Wilmington Steamboat Company had the "Zephyr," whose hull dimensions were 179'x27'x8'6, with a beam engine of 34 inches by 9 feet stroke and run to Wilmington until 1863, when sold to go south

but was lost on the way. She was built for the Hudson River and proved very fast while there. In 1865, the "Samuel M. Felton," a fine boat of 211'x29'x9'6", with an engine of 56-inch cylinder by 11-foot stroke was built, began running from Philadelphia to Wilmington and continued on the route until 1885, when the opposition became so strong and fare cut to so low a figure that it was a losing investment to continue, when the vessel was withdrawn from the service.

The finest boats that have been on the route are the present propellers covering the distance, the "Brandywine" and the "City of Chester." The former was built in 1885, by the Harlan & Hollingsworth Co., and the latter in 1887, by the same builders. The former is 177'x25'x8'6", with compound engine having cylinders of 24" and 42"x24", and two locomotive boilers originally. The latter is 185'6"x28'x9', with triple-expansion engine having cylinders 18½" and 27" and 42"x24-inch stroke. One of the owners in this line of boats, J. Shields Wilson, was among the early marine engineers of this country in applying the compound engine during the period of its development with the screw engine about 1872 or 1874.

Outside of the four-iron-canal propellers that were built at New York, in 1842, for the Delaware & Raritan Canal Company, there was built the same year at Philadelphia, by Moses Starr & Sons, who had a boiler and machine shop in the upper part of the city, an iron-hull side-wheel steamboat, whose dimensions were 80'x12'x4½', with two high-pressure engines, named "Appiquinuminck." This vessel run a short time to Odessa, but was subsequently sold for service in Central America. This was the first iron-hull steamboat built on the Delaware River for local use. The next year John F. Starr built at Camden, N. J., for the Baltimore and Philadelphia Steamboat Company, the "Conestoga," a twin-screw propeller of 80'x16'x6', having an iron hull. Builder of the hull also built the boiler, and propellers that were of Ericsson's patent, while the engine was constructed by Reanie, Neafie & Co. In 1844, the same builder constructed the hull of a small side-wheel steamboat named "Independence," also having an iron hull of 90'x15'x5'. She was fitted with an oscillating engine of 16"x6', built by I. P. Morris & Co., of Philadelphia. The vessel run to Bridgeport, for a time, and shortly after was placed in the towing business

on the river. At one time the name "W. G. Thomas" was on her wheel-houses. There were a few iron-hull barges built about the same time for the transportation of freight, but the former named were the first three iron-hull steam vessels constructed on the Delaware River for local use.

In 1844, Jesse W. Starr, of Camden, N. J., constructed the side-wheel tow-barge "Camden" for the Delaware & Raritan Canal Company, of 130 feet by 20 feet beam, and in 1845 built the tow-barge "Mars" for the same company.



CHAPTER IV.

WESTERN RIVERS.



THE first steamboat to ply upon the western rivers was the "New Orleans," built at Pittsburg, Pa., by Livingston & Fulton, under the supervision of Nicholas J. Roosevelt, in 1811, who had been associated with Livingston and Stevens in their experiments with steam navigation on the Hudson River, prior to Livingston being appointed Minister of France, in 1800. The plans of this vessel were decided on in New York by Robert Fulton. It was 116 feet long by 20 feet beam and about 7 feet depth of hold, and fitted with a low-pressure engine of 34-inch cylinder, and propelled by side wheels, with the boiler in the hold of the vessel. This vessel was built on the bank of the Monongahela River, close by a small creek and under what was known as Boyd's Hill, on the site occupied by the Pittsburg and Connellsville R. R. depot, and in close proximity to Beelen's foundry. A shipbuilder, as well as the mechanics required to erect the machinery, were brought from New York, but the ship carpenters who were accustomed to building barges were obtained at Pittsburg. The timber for the vessel was procured by sending men into the forests to cut it, then transporting it to the Monongahela River and rafting it down to the shipyard. White pine was used for planking, as the only material that could be obtained without delay. In this vessel there were two cabins, one forward and one aft, the former a large one for men, and the latter for women, which was fitted with four berths and comfortably furnished. The vessel was also fitted with two masts and sails, as Fulton believed at this time that sails were occasionally useful. This vessel cost about \$38,000.

In the latter part of September, 1811, the "New Orleans," after a short experimental trip up the Monongahela River, commenced her voyage* with Nicholas J. Roosevelt and his

* The First Steamboat Voyage on the Western Waters, by J. H. B. Latrobe.

wife as the only passengers. There was a captain, an engineer named Baker, Andrew Jack the pilot, six hands, two female servants, a man waiter, a cook, and an immense Newfoundland dog named "Tiger." Thus equipped, the "New Orleans" began the voyage that changed the relations of the West, which may almost be said to have changed its destiny. When it became known that Mrs. Roosevelt intended to accompany her husband on the voyage, the numerous friends she had made in Pittsburg endeavored to persuade her from what was regarded as utter folly, if not absolute madness, and her husband was told that he had no right to peril his wife's life, however reckless he might be of his own.

It should be here stated, that about June, 1809, Roosevelt started from Pittsburg, accompanied by his wife, for the purpose of making investigations regarding the currents of the rivers to be navigated by steam vessels, in a flat boat he had built at Pittsburg, and that was manned by an experienced crew and a pilot, three hands and a cook. It was then a question whether steam could be employed in navigating the western rivers, which its success on the Hudson River was not regarded as having entirely solved. He stopped at Cincinnati, Louisville and Natchez, which were then the only places of any size, and that very small. Furnished with letters of introduction to the leading citizens he stated his purpose in visiting the West, but from none did he receive any encouragement, as they were incredulous of steam being able to resist the strong and whirling currents of the western rivers. He gauged them; he measured their velocity at different seasons, and obtained all the statistical information within his reach, and formed a judgment with respect to the future development of the country west of the Alleghanies that has since been amply corroborated. Not only did he do this, but finding coal on the banks of the Ohio, he purchased and opened mines of the material, and so confident was he of the success of the project on hand, that he caused supplies of the fuel to be heaped upon the shore in anticipation of the wants of a steamboat whose keel was yet to be laid. He arrived in New Orleans in December, 1809, and immediately sailed for New York, where he arrived in January, 1810. His report, bearing on its face the evidence of the thoroughness of his examinations, im-

pressed Fulton and Livingston with his own convictions, and in the spring of that year he returned to Pittsburg to superintend the construction of the "New Orleans."

It has been stated by some writers that *it was probable* that the engine for this vessel was one of Boulton & Watt's construction, but this was not so. Shops were erected for the building of parts of the machinery, and as Roosevelt had built steam engines at his works at Belleville on the Passaic River, New Jersey, where all the work in the experiments by Livingston, Stevens and himself were done from 1797 to 1799, the construction of the vessel was in the hands of one who had some experience in the construction of steam vessels. Besides, Robert Fulton had built at New York the engines for the "Raritan," the "Car of Neptune," and the "Paragon," prior to the engine for the "New Orleans" being constructed. There seems to be no doubt in the least that the larger part of the machinery for this vessel was built at New York, sent out in parts and put together on board the vessel. Mechanics were sent from the East for its erection on board, and some of these men remained in the West, and grew up with the country. Shops were erected and tools sent from the East at a later date for the construction of the engines of their other vessels. It was, no doubt, of the same type of engine as Fulton had built for his Hudson River boats.

The incidents of the trip from Pittsburg to New Orleans, with the effects of the earthquake on the river while they were on the way after leaving Louisville, form a very romantic tale as told by a relative of Mr. Roosevelt.

"The people of Pittsburg turned out in mass and lined the banks of the Monongahela to witness the departure of the steamboat, and shout after shout rent the air, and handkerchiefs were waved, and hats thrown up by way of "Godspeed" to the voyagers as the anchor was raised, and heading up stream for a short distance a wide circuit brought the "New Orleans" on her proper course, and steam and current aiding, she disappeared behind the first headlands on the right bank of the Ohio.

"Too much excited to sleep, Roosevelt and his wife passed the greater part of the first night on deck, and watched the shore covered then with an almost unbroken forest, as reach

after reach, and bend after bend, were passed at a speed of from 8 to 10 miles an hour. The regular working of the engine, the ample supply of steam, the uniformity of the speed, inspired at last a confidence that quieted the nervous apprehension of the travelers. Andrew Jack, the pilot, delighted with the facility with which the vessel was steered, and at a speed to which he was so little accustomed, ceased to express misgivings and became as sanguine as Mr. Roosevelt himself in regard to the success of the voyage. The very crew of unimaginative men were excited with the novelty of the situation, and when the following morning all hands assembled on deck to return the cheers of a village whose inhabitants had seen the boat approaching down a long reach in the river, and turned out to greet her as she sped by, it probably shone upon as jolly a set as ever floated on the Ohio.

"On the second day after leaving Pittsburg, the "New Orleans" rounded to opposite Cincinnati, and cast anchor in the stream. Levees and wharf boats were things unknown in 1811. Here as at Pittsburg, the whole town seemed to have assembled on the bank, and many of the acquaintances of the former visit came off in small boats. 'Well, you are as good as your word; you have visited us in a steamboat,' they said, 'but we see you for the last time. Your boat may go down the river, but as to coming up it, the very idea is an absurd one.' This was one of those occasions on which seeing was not believing. The keel boatmen, whose shoulders had hardened as they pressed their poles for many a weary mile against the current, shook their heads as they crowded around the strange visitor, and bandied river wit with the crew that had been selected from their own calling for the first voyage. Some flat boatmen, whose ungainly arks the steamboat had passed a short distance above the town, and who now floated by with the current, seemed to have a better opinion of the newcomer, and proposed a tow in case they were again overtaken. But as to the boats returning, all agreed *that* could never be.

"The stay at Cincinnati was brief, only long enough to take in a supply of wood for the voyage to Louisville, which was reached on the night of the fourth day after leaving Pittsburg. It was midnight on the first of October 1811, that the

"New Orleans" dropped anchor opposite the town. There was a brilliant moon; it was as light as day almost, and no one on board had retired. The roar of the escaping steam, then heard for the first time at the place, where now its echoes are increasing, roused the population, and late as it was crowds came rushing to the bank of the river to learn the cause of the unwonted uproar. A letter now before me, written by one of those on board at the time, records the fact that there were those who insisted that the comet of 1811 had fallen into the Ohio and had produced the hubbub.

"The morning after the arrival of the vessel at Louisville, Mr. Roosevelt's acquaintances and others came on board, and here the same things were said that had been said at Cincinnati. Congratulations at having descended the river were without exception, accompanied by regrets that it was the first and last time a steamboat would be seen above the Falls of the Ohio. Still, so far, certainly Mr. Roosevelt's promises had been fulfilled, and there was a public dinner given to him a few days after his arrival. Here any number of complimentary toasts were drunk, and the usual amount of good feeling on such occasions was manifested.

"Not to be outdone in hospitality, Mr. Roosevelt invited his hosts to dine on board the "New Orleans," which still lay anchored opposite the town. The company met in the forward, or gentlemen's cabin, and the feast was at its height, when suddenly there was heard unwonted rumblings, accompanied by a very perceptible motion in the vessel. The company had but one idea. The "New Orleans" had escaped from her anchor, and was drifting toward the Falls, to the certain destruction of all on board. There was an instant and simultaneous rush to the upper deck, when the company found that instead of drifting towards the Falls of the Ohio, the "New Orleans" was making good headway up the river and would soon leave Louisville in the distance down stream. As the engine warmed to its work, and the steam blew off at the safety valve, the speed increased. Mr. Roosevelt, of course, had provided this mode of convincing his incredulous guests, and their surprise and delight may readily be imagined. After going up the river for a few miles, the "New Orleans" returned to her anchorage.

"It had been intended on leaving Pittsburg, to proceed as rapidly as possible to New Orleans, to place the boat on the route for which it was designed, between that city and Natchez. It was found, however, on reaching Louisville, that there was not sufficient depth of water on the Falls of the Ohio to permit the vessel to pass over them in safety. Nothing was to be done, therefore, but to wait as patiently as possible for a rise in the river. That this delay might, as far as practicable, be utilized to the extent at least of convincing the incredulous Cincinnatians, the "New Orleans" returned to that city, where she was greeted with an enthusiasm that exceeded even what was displayed on her descent from Pittsburg. No one doubted now. In 1832, I was detained for several days in Cincinnati on my return from a visit to the South. There were numbers then alive who remembered the first advent of steam, and from some of these I learned what is here stated in regard to the public feeling at the time—the universal incredulity of the first visit, the unbounded confidence inspired by the second.

"Returning to Louisville, the great interest of all on board the "New Orleans" centered in watching the rise in the Ohio. Rain in the upper country was what was wanted, and of this there seemed small promise. There was nothing in the aspect of the heavens that indicated it. On the contrary, there was a dull misty sky without a cloud; the leaden atmosphere that weighed upon the spirits, and the meaning of which would have been better understood at Naples, under the shadow of Vesuvius, than on the banks of the Ohio. The sun, when it rose, looked like a globe of red hot iron, whose color brightened at noon to resume the same look when it sank below the horizon. All day long, one might have gazed on it with unflinching eyes. The air was still and heated, and a sense of weariness was the characteristic of the hours as they wore slowly by. At last, and when a nervous impatience affected every one on board, it was announced one morning that there had been a rise in the river during the night. There was another announcement of a very different character: Mrs. Roosevelt had become a mother. The events of the voyage were certainly multiplying. Morning after morning the rise in the river during the night was reported, and finally in the

last week in November, it was ascertained that the depth of water in the shallowest portion of the Falls exceeded by five inches the draft of the boat. It was a narrow margin, but the rise had ceased; there was no telegraph in those days to tell hourly what was the weather in the country drained by the Ohio, and Mr. Roosevelt, assuring himself personally of the condition of the Falls, determined to take the responsibility and go over them if he could; it was an anxious time. All hands were on deck. Mrs. Roosevelt, whom her husband would willingly have left behind to join him below the Falls, refused to remain on shore and stood near the stern. Two pilots, for an extra one had been engaged for the passage through the rapids, took their places in the bow; the anchor was weighed. To get into the Indiana Channel, which was the best, a wide circuit had to be made, bringing her head down stream, completing which the "New Orleans" began the descent. Steerage way depended upon her speed exceeding that of the current. The faster she could be made to go, the easier would it be to guide her. All the steam the boiler would bear was put upon her. The safety valve shrieked, the wheels revolved faster than they had ever done before, and the vessel, speaking figuratively, fairly flew away from the crowds collected to witness her departure from Louisville. Instinctively, each one on board now grasped the nearest object, and with bated breath awaited the result. Black ledges of rock appeared only to disappear as the "New Orleans" flashed by them. The waters whirled and eddied, and threw their spray upon the deck, as a more rapid descent caused the vessel to pitch forward to what at times seemed inevitable destruction. Not a word was spoken; the pilots directed the men at the helm by motions of their hands. Even the great Newfoundland dog seemed affected by the apprehension of danger, and came and crouched at Mrs. Roosevelt's feet. The tension on the nervous system was too great to be long sustained. Fortunately, the passage was soon made, and with feelings of profound gratitude to the Almighty at the successful issue of the adventure, on the part of Mr. Roosevelt and his wife, the "New Orleans" rounded to in safety below the Falls. There was still the same leaden sky, the same dim sun during the day, the same starless night; but the great difficulty had been overcome, and it was believed

that there would now be nothing but plain sailing to the port of destination. It was yet to be seen how far the expectations of those on board in this respect would be realized.

"Hitherto, the voyage had been one of pleasure. Nothing had marred the enjoyment of the travelers. The reception at Louisville and Cincinnati had been great events; but now were to come, to use the words of the letter already referred to, "those days of horror." The comet of 1811 had disappeared and was followed by the earthquake of that year, of which the atmospheric phenomena just mentioned were the prognostics. But the earthquake accompanied the "New Orleans" far on her way down the Mississippi.

"The first shock that was observed was felt on board the "New Orleans" while she lay at anchor after passing the Falls. The effect was as though the vessel had been in motion and had suddenly grounded. The cable shook and trembled, and many on board experienced for the moment a nausea resembling seasickness. It was a little while before they could realize the presence of the dread visitor. It was wholly unexpected. The shocks succeeded each other during the night, and when morning came the voyage was resumed, and the monotonous beating of the wheels and the steady progress of the vessel prevented the disturbance from being noticed.

"It has already been mentioned, that in his voyage of exploration, Mr. Roosevelt had found coal on the Ohio, and that he had caused mines to be opened in anticipation. Their value was now realized, and when he reached them on his way down the river, he took on board as much coal as he could find room for.

"Some miles above the mouth of the Ohio, the diminished speed of the current indicated a rise in the Mississippi; this was found to be the case. The bottom lands on either shore were under water, and there was every sign of an unwonted flood; canoes came and went among the boles of the trees. Sometimes the Indians attempted to approach the steamboat, and again fled on its approach. The Chickasaws still occupied that part of the State of Tennessee lying below the mouth of the Ohio, and on one occasion a large canoe, fully manned, came out of the woods abreast of the steamboat. The Indians outnumbering the crew of the vessel paddled after it; there

was a race at once, and for a time the contest was equal. The result, however, was what might have been expected; steam had the advantage of endurance, and the Indians with wild shouts, which might have been shouts of defiance, gave up the pursuit and turned into the forest from whence they had emerged.

"While the crew of the "New Orleans" were more amused than alarmed at this incident of the voyage, Mr. Roosevelt, who had not forgotten the visit to the flat boat on the preliminary exploration, was not sorry now when he lost sight of the canoe. That he bestowed a second thought upon the matter, illustrates the nervous excitement that prevailed on board. Mrs. Roosevelt and himself were discussing the adventure when they retired to rest; they had scarcely fallen asleep, when they were aroused by shouts on deck, and the trampling of many feet. With the idea of Indians still predominant, Mr. Roosevelt sprang from his bed and seizing a sword—the only weapon at hand—hurried from the cabin to join battle, as he thought with the Chickasaws. It was a more alarming enemy that he encountered—the "New Orleans" was on fire—and flame and smoke issued from the forward cabin. The servant who attended there had placed some green wood too close to the stove in anticipation of next day's wants, and laying down beside it had fallen asleep, the stove becoming overheated this wood had taken fire. The joiner's work close by had caught fire, and the entire cabin would soon have been in flames had not the servant, half suffocated, rushed on deck and given the alarm. By dint of great exertion, the fire which by this time was making rapid headway was extinguished, but not until the interior woodwork had been either destroyed, or grievously defaced. Few eyes were closed for the remainder of the night, nor did the accident tend to tranquilize the nerves of the travelers.

"A supply of provisions had been taken on board the "New Orleans" at Louisville, amply sufficient for the voyage to Natchez, and this was occasionally supplemented by purchases at settlements along the river. These, however, were few and far between, and not at all to be relied on. The crew accustomed to the simple fare of boatmen on the Mississippi was easily provided for; the commissariat of the voyage,

therefore,—longer than a voyage to Europe now—gave no trouble.

“Early in the afternoon of each day the steamer was rounded to and fastened to the bank, the crew going ashore to cut the wood required, after the coal was exhausted, for the next day’s consumption. On some of these occasions, squatters came on board with tales of their experience upon the land, which they insisted shook and trembled under their feet. At New Madrid, a great portion of which had been engulfed, as the earth opened in vast chasms and swallowed up houses and their inhabitants, terror-stricken people had begged to be taken on board, while others, dreading the steamboat even more than the earthquake, hid themselves as she approached. To receive the former was impossible. The would-be refugees had no homes to go to, and ample as was the supply of provisions for Mr. Roosevelt and his wife, it would have been altogether insufficient for any large increase of passengers, and as to obtaining provisions on the way, the “New Orleans” might as well have been upon the open sea. Painful as it was, there was no choice but to turn a deaf ear to the cries of the terrified inhabitants of the doomed town.

“One of the peculiar characteristics of the voyage was the silence that prevailed on board. No one seemed disposed to talk, and when there was any conversation it was carried on in whispers, almost.

“‘Tiger,’ who appeared alone to be aware of the earthquake while the vessel was in motion, prowled about moaning and growling, and when he came and placed his head on Mrs. Roosevelt’s lap, it was a sure sign of a commotion of more than usual violence. Orders were given in low tones, and the usual cheerful ‘aye, aye, Sir’ of the sailors was almost inaudible. Sleeplessness was another characteristic. Sound, continuous sleep was apparently unknown. Going ashore for wood was the event of each 24 hours, and was looked forward to by the crew with satisfaction, notwithstanding the labor it involved; and yet the men, if not sullenly, toiled silently; and if the earth shook, as it often did, while they were at work, the uplifted axe was suspended, or placed quietly on the log, and the men stared at each other until it ceased. Nor was this depression confined to the steamer; flat

boats and barges were passed whose crews instead of bandying river wit as they had done when met on the voyage from Pittsburg to Louisville, uttered no word as the "New Orleans" passed by. Before the travelers had been many days on the Mississippi, they fancied as they looked at each other that they had become haggard. Mrs. Roosevelt records 'that she lived in a constant fright, unable to sleep, sew or read.'

"Sometimes Indians would join the woodchoppers, and occasionally one would be able to converse in English with the men. From these it was learned that the steamboat was called the "Penelore," or "Fire Canoe," and was supposed to have some affinity with the comet that had preceded the earthquake, the sparks from the chimney of the boat being likened to the train of the celestial visitant. Again they would attribute the smoky atmosphere to the steamer, and the rumbling of the earth to the beating of the waters by the fast revolving paddles. To the native inhabitants of the boundless forest that lined the river banks, the coming of the first steamboat was an omen of evil, and as it was a precursor of their own expulsion from their ancient homes, no wonder they continued for years to regard all steamboats with awe. As late as 1834, when the emigration of the Chickasaws to their new homes west of the river took place, hundreds refused to trust themselves in such conveyances, but preferred making their long and weary pilgrimage on foot.

"One of the most uncomfortable incidents of the voyage was the confusion of the pilot, who became alarmed, and declared that he was lost, so great had been the changes in the channel caused by the earthquake; where he had expected to find deep water, roots and stumps projected above the surface, and tall trees, that had been guides, disappeared; islands had changed their shapes, cut-offs had been made through what was forest land when he saw it last. Still, there was no choice but to keep on; there was no place to stop at, there was no possibility of turning back.

"In the first part of the voyage when the steamboat rounded to at night, she was made fast to the river bank, but when it was seen that trees would occasionally topple and fall over, as the ground underneath them was shaken or gave way, it was thought safer to stop at the foot of an island,

which might serve as a breakwater, taking care the trees were far enough from the boat to obviate apprehension from them. Once, however, when such a fastening had been made and a plank carried ashore, and the wood-chopping had been finished at an earlier hour than usual, a new experience was had. No shock had been felt during the day, and Mrs. Roosevelt anticipated a quiet rest. In this, however, she was disappointed. All night long she was disturbed by the jar and noise produced by hard objects grating the planking outside the boat. At times severe blows were struck that caused the vessel to tremble through its entire length; then there would follow a continuous scratching, mingled with the gurgling sound of water. Driftwood had caused sounds of the same sort before, and it was thought driftwood was again busy in producing them. With morning, however, came the true explanation. The island had disappeared, and it was the disintegrated fragments sweeping down the river that had struck the vessel, from time to time, and caused the noises that Mrs. Roosevelt had been disturbed by. At first it was supposed that the "New Orleans" had been borne along by the current, but the pilot pointed to land marks on the banks, which proved that it was the island that had disappeared while the steamboat had kept its place. Where the island had been there was now a broad reach of the river, and when the hawser was cut, for it was found impossible otherwise to free the vessel, the pilot was utterly at a loss which way to steer. Some flat boats were hailed, but they, too, were lost; their main effort was by dint of their long oars to keep where the current was the strongest. This was evidently the best plan for the "New Orleans"; it was not without its peculiar risks, however, in the bends, where the rushing waters struck the shore to whirl around the curve, and glance off to form a bend in an opposite direction; the deepest water was immediately under the bank, and here the trees, undermined by the current, would be seen at times to sink into the stream often erect until the waters covered their topmost twigs, sometimes falling against each other, interlacing their great arms, as strong men might do struggling for life when drowning: sometimes they fell outward into the water, and then woe to the vessel that happened to be near them in the bend. This danger, however, steam enabled the

"New Orleans" to avoid. Referring to it all, it is not wonderful that the survivor of the voyage still speaks of it as 'one of anxiety and terror.'

"As the "New Orleans" descended the river it passed out of the region of the earthquake, and the principal inconvenience was the number of shoals and snags, and "sawyers." These were all safely passed, and the vessel came in sight of Natchez, and rounded to opposite the landing place. Expecting to remain here for a day or two, the engineer had allowed his fires to go down, so that when the boat turned its head up stream it lost headway altogether, and was being carried down by the current far below the intended landing. Thousands were assembled on the bluff and at the foot of it, and for a moment it would have seemed that the "New Orleans" had achieved what she had done so far, only that she might be overcome at last. Fresh fuel, however, was added—the engine was stopped that steam might accumulate, and presently the safety valve lifted—a few turns of the wheels steadied the boat, and a few more gave her headway, and overcoming even the Mississippi current, she gained the shore amid shouts of exultation and applause.

"The romance of the voyage ended at Natchez, where the same hospitalities were extended to Mr. and Mrs. Roosevelt that had been enjoyed at Louisville. From thence to New Orleans there was no occurrence worthy of note."

✕ It is known the "New Orleans" arrived at the city of that name about January 12th, 1812, and about a week later was placed on the route between New Orleans and Natchez, for passengers and freight, which service she continued to perform until July 14th, 1814, ✕ when, while lying a few miles above Baton Rouge over night, and the water in the river having fallen, it was found in the morning, upon preparing to resume her trip up the river to Natchez, that she was lodged on a stump, and, while working to free her from the perilous situation, a leak was sprung, sinking her in a short time: no lives were lost. Her speed was about three miles per hour against the current of the river.

In 1813, Daniel French, of Pittsburg, Pa., altered a river barge, giving her more freeboard by building up her sides, into which he placed an engine constructed by himself. This

vessel was about twenty-five tons burden, called the "Comet," and was owned by Daniel D. Smith. She went as far as Louisville in the summer of the same year, and during the next year went to New Orleans. She made a few voyages between the latter city and Natchez, after which she was sold, her engine taken out and put up in a cotton mill, and her hull broken up.

In December, 1813, the "Vesuvius" was launched from the shipyard of Fulton & Livingston, at Pittsburg, Pa. This was a side-wheel boat of 153 feet long by 28 feet 6 inches beam and 9 feet 4 inches depth of hold, and 6 feet 6 inches draft of water, with an engine similar to that in the "New Orleans." She had below the main deck a ladies' cabin, and on the main deck a house about 60 feet in length, fitted with about 60 berths. Her boiler was in the hold of the vessel, and the freight was carried below the main deck. Her speed, as developed upon her trial trip, was eight miles per hour with the current. In the spring of 1814, she was placed on the route between Louisville and New Orleans, and her time from Pittsburg to New Orleans was 266 hours.

In July, of the same year, she started from New Orleans for Louisville, but was grounded on a sand bar 700 miles up the Mississippi, where she remained until the 3d of December following, when, being floated off by the tide, she returned to New Orleans. In 1815 and 1816 she made regular trips for several months from New Orleans to Natchez. During the latter year, while approaching New Orleans with a valuable cargo on board, she took fire and was burned to the water's edge. After being submerged for several months, her hull was raised and she was again fitted for service. She was subsequently in the Louisville trade, and was condemned in 1819.

The "Vesuvius," with some other boats of Fulton's companies, believed to have been the "New Orleans," the "Etna," and the "Buffalo," were under contract with the U. S. Government during the war with England at this period, for the transportation of troops and munitions of war on the western rivers. The former vessel while in service got aground from a fall of water in the river, remaining in that situation for

nearly three months, for which her owners claimed a remuneration from the U. S. Government equal to the profits they might have made in that time, had she not been impressed and taken for the service of the government. This matter, with some other claims by the heirs of Robert Fulton against the government, was the subject of a bill passed in Congress in July, 1846, for their settlement.

The "Enterprise" was built at Bridgeport, on the Monongahela River, during the spring of 1814, for the New Orleans and Pittsburg route. This was a stern-wheel boat of 80 feet in length and 29 feet beam, fitted with mast and sails, as were the steamboats of this date; but during the winter of 1814 the sails and rigging were laid aside. She was owned by parties at Brownsville, Pa., and was fitted with an engine constructed by D. French, under his patent, who had built one for the "Comet" in 1813. On her trial trip she attained a speed of three and one-half miles per hour against the current of the Monongahela River. She made two voyages to Louisville in the summer of 1814, and in December, of the same year, conveyed a cargo of ordnance stores from Pittsburg to New Orleans. While at the last-named port she was pressed into service by General Jackson, for which her owners were afterwards paid by the U. S. Government, and while engaged in this service was useful in transporting troops, arms, and munitions of war. She left New Orleans for Pittsburg on the 6th of May, 1815, and reached Louisville after a passage of 25 days, thus completing the first steamboat trip ever made from New Orleans to Louisville. At the time this trip was made, the water was so high in the rivers that the banks in many places were overflowed, consequently there was little, if no current. The "Enterprise" was able to make her way up without much difficulty by running through the "cut-offs," and over inundated fields in still water. In view of these favorable circumstances the trip was not generally held to be satisfactory, the public being still in doubt whether a steamboat could ascend the Mississippi when that river was confined within its banks, and the current as rapid as when at its average depth. During the spring of 1815, this boat made a trip from New Orleans to Natchez, 273 miles, in four days, against an unusually strong current then running in the Mississippi River. It is believed

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this vessel was in use on the Father of Waters until about 1819.

In July, 1814, there was launched from Fulton & Company's shipyard, at Pittsburg, the "Buffalo," which was designed to run between Pittsburg and Louisville. This was one of the steamboats under contract with the U. S. Government at the same time with the "Vesuvius," and the "New Orleans" and others of the Fulton Company.

The following copy of a letter of Robert Fulton to David Cook, of Pittsburg, Pa., will show some of the trials and vexations attending the construction of steamboats on the western rivers by the early promoters of the enterprise. The letter is written from New York, but the post-mark is from Trenton, N. J., on the day following—January 25, 1815,—and as Fulton was at this time engaged in a legal contest with parties in New Jersey regarding his steamboat interests, it is more than probable that he was at Trenton when he mailed this letter:

NEW YORK, January 24, 1815.

Mr. Cook:

DEAR SIR—After writing you yesterday I received your letter of the 13th inst., from which I find I do not yet correctly understand the complicated and disastrous affairs of the "Buffalo." You say the amount of debts due workmen and others left unpaid by Mr. Latrobe amount to *\$9,600. Mr. Latrobe makes claim of *\$6,000. Mr. Stoudinger states in his estimate that it will require to finish her and her freight boat, to make them good and serviceable, *\$13,000. Mr. Latrobe has received of the stockholders, \$37,000; of me about \$1,600. Total for one boat, \$67,200.

Is this the true statement—that is, are the three sums marked* correct?

To give me a clear and correct view of the facts, let me know by return of post, or as soon after as possible.

First—What is the amount of all demands from workmen and others against the "Buffalo?"

Second—What the total amount of Mr. Latrobe's demand, and for what? Apply to him for it.

Third—How much will it require to complete her and her freight boat, kitchen and furniture and every outfit included?

With this information, I can judge of her total cost, the sums required, and whether it be practicable to procure them. Until such information arrives, you cannot do anything for the "Buffalo." I have no funds of her company. But proceed with all despatch to finish the "Etna" and get her off. I have made such arrangements for her payments and all sums due by her owners that the whole shall be paid before June, the major part in much less time, hence the creditors of the "Vesuvius" and "Etna" need have no concern. You will also proceed with the "New Orleans" and "Natchez" hull, for which her company will provide as required.

As to Mr. O'Hara's land, on which Mr. Latrobe built shops, I cannot purchase it, however advantageous. I am tired of distant operations, nor will the Ohio Company purchase it; they are alarmed and disgusted with the expenses and state of their affairs.

The whole expense of the shops and tools erected and constructed by Mr. Latrobe, without my sanction, advice or consent, must not be admitted into his accounts. The cost of the boats and machinery in their present state, and his salary for the time he was employed, is all that can be admitted. Please answer me fully on these points without delay, particularly on the first question.

Yours,

ROBT. FULTON.

When do you think the "Etna" will start and the "New Orleans" be launched?*

In 1814, the "Etna" was built of the same dimensions as the "Vesuvius," at Fulton's yard, and was intended to run in connection with the latter vessel, between Pittsburg and Louisville, to form a through line from Pittsburg to New Orleans. She was subsequently under contract with the U. S. Government at New Orleans.

There was launched at Bridgeport, Pa., in the summer of 1815, the "Despatch," owned by the "Monongahela & Ohio Steamboat Company, the same parties who owned the "Enterprise." Her engine was designed and constructed by D. French, of Pittsburg, Pa., and was intended for a fast boat of

*The original letter is now in the possession of the Author of this work.

that day, but whether she ever fulfilled the expectations of her owners, there is no record.

In the same year there was built at Wheeling, W. Va., by George White, under the direction and superintendence of Capt. Henry M. Shreve, the steamboat "Washington." Her length was 148 feet, and her engines were constructed at Brownsville, Pa. The entire construction of the boat comprised various innovations, which were suggested by the ingenuity and experience of Capt. Shreve. This vessel was the first "two-decker" on the western waters; the cabin was placed between the decks. It had been the general practice to place the boilers in the hold, but Capt. Shreve placed them in this vessel on deck, which arrangement was found such an improvement that the practice has been continued to this day on the western river boats. The engines constructed for Fulton's vessels, or under his patent, had upright and stationary cylinders, while in French's engines* vibrating cylinders were used. Capt. Shreve had the cylinder of the "Washington" placed in a horizontal position, and gave the vibrations to the pitman, or connecting rod. Fulton, and French used single and low-pressure engines. Shreve employed a high-pressure engine, 24 inches diameter by 6 feet stroke. This was the first engine of that kind ever used on the western rivers. David Prentice had previously used cam-wheels for working the valves of the cylinder. Capt. Shreve added his invention of the cam cut-off; also flues to the boilers, by which three-fifths of the fuel was saved.

On the 24th of September, 1816, the "Washington" passed over the Falls of the Ohio on her first trip to New Orleans, and returned to Louisville in November following. While at New Orleans, the ingenuity of her construction excited the admiration of the most intelligent citizens of that place. Edward Livingston, after a critical examination of the boat and her machinery, remarked to Capt. Shreve: "You deserve well of your country, young man, but we (referring to Fulton and Livingston's monopoly), shall be compelled to beat you in the courts, if we can."

*In all probability, this D. French was the first builder of an oscillating engine for marine purposes. He was in New York previous to his building engines on the Ohio River.

✓ An accumulation of ice in the Ohio compelled the "Washington" to remain at the Falls until March 12, 1817. On that day she commenced her second voyage to New Orleans. She accomplished this trip and returned to Shippingsport, at the foot of the falls, in forty-one days. The ascending voyage was made in twenty-five days.

It was now practically demonstrated to the satisfaction of the public in general, that steamboats could ascend this river in less than one-fourth the time which the barges and keel-boats had required for the same purpose. ✕ This feat of the "Washington" produced almost as much popular excitement and exultation in that region as the battle of New Orleans. The citizens of Louisville gave a public dinner to Capt. Shreve, at which he predicted the time would come when the trip from New Orleans to Louisville would be made in ten days. Although this may have been regarded as a boastful declaration at that time, the prediction has been more than fulfilled; for even in 1853 the trip was made in four days, nine hours and thirty-one minutes.

✕ After that memorable voyage of the "Washington," all doubts and prejudices in reference to steam navigation were removed. ✕ Shipyards began to be established in every convenient locality, and the business of steamboat building was vigorously prosecuted. But a new obstacle now presented itself, which, for a time, threatened to give an effectual check to the spirit of enterprise and progression which had just been developed. We refer to the claims made by the interests of Fulton and Livingston to the exclusive right of steam navigation on some of the rivers of the United States. This claim being resisted by Capt. Shreve, the "Washington" was attached at New Orleans, and taken possession of by the sheriff. When the case came for adjudication before the District Court of Louisiana, that tribunal promptly negatived the exclusive privileges claimed by Livingston and Fulton, which were decided to be unconstitutional. The monopoly claims of Livingston and Fulton were finally withdrawn in 1819, and the last restraint on the steamboat navigation of the western rivers was thus removed, leaving western enterprise and energy at full liberty to carry on the great work of its improvement. This work had so progressed, that in 1856 no less than *eight hundred* steam-

boats were in constant operation on the Ohio and Mississippi and their tributaries.

It was on this steamboat that the first explosion of a marine boiler occurred on the western rivers. Before she had taken her place on the route to New Orleans, and while on the Ohio River on June 9, 1816, the head of one of the boilers blew out, killing eight and scalding seven persons, among the latter being Capt. Shreve and the chief engineer. The cause of this explosion was the slipping of the safety-valve weight to the end of the lever, thereby permitting an over-pressure of steam to accumulate in the boilers.

The subject of the steamboat monopoly, held by Fulton and Livingston, would appear to have received the attention of the legislature of Orleans about the time the "Washington" was enjoined from navigating the western rivers, by the following report, made by a committee of the House of Representatives, of the Territory of Orleans, January 18th, 1817:

"Regarding the expediency of repealing an Act of the Legislature of the Territory of Orleans, granted to Robert R. Livingston and Robert Fulton, the sole privilege of using steamboats for a limited time.

"Your committee of Commerce and Manufactures, to whom had been referred the resolution for the purpose of inquiring whether it would be proper to repeal the charter granted by the legislature of this State, in the year 1811, to Robert R. Livingston and Robert Fulton, have examined the subject with due attention, and beg leave to make the following report:

"Messrs. Livingston and Fulton, after having, in the year 1811, obtained the charter which grants to them the exclusive privilege of navigating the Mississippi, with vessels propelled by steam, have used the utmost activity and exertions in order to put it in execution.

"In the year 1812, the citizens of this State witnessed, for the first time, the magnificent spectacle exhibited by the steamboat "New Orleans," navigating the waters of the Mississippi. They soon were enabled to appreciate the manifold advantages which result from that sublime invention, so happily protected by the State. The first of those advantages, and the one which was most lively, was the facility and promptness

of the intercourse between the most distant parts of the State, which that new means of conveyance affords, and next, the reduction which took place in the price of freight. Your committee owe it to justice and truth to say, that the privileged owners immediately complied with that part of the charter, which made it their duty to show whether the steamboat "New Orleans" possessed all the necessary qualifications in order to enable them to make use of their privilege, and to establish a rate of freight, by one-fourth less considerable than that which was customary between Natchez and New Orleans. The annexed certificate signed by Messrs. Thos. Urquhart, William Donaldson, Jacob Trimble, B. Chew and L. P. Seguin proves that those formalities were complied with on the 19th of January, 1812. Encouraged by this success, the owners soon gave us another steamboat, and in 1813 the "Vesuvius" appeared at New Orleans. She was followed in 1814 by the "Etna." However, the company experienced very severe losses. Every one knows the "New Orleans" was wrecked in 1814, and that the "Vesuvius" was, in 1816, consumed by fire in the port of this city. These losses were soon repaired. A new boat, bearing the same name, was built in this port in 1816, in the place of the one wrecked, and we all witnessed the "Vesuvius" springing up again from her ashes in the space of two or three months, much to the credit of the skill of our shipbuilders, and of the zeal of the company; that fine boat, although she was launched but a few weeks ago, is now nearly ready to get into operation.

"The committee, whose inquiries have enabled them to ascertain the truth of the facts just stated, far from thinking it useful or necessary to repeal the charter of the company, do, on the contrary, think that they ought to be encouraged by all possible means. Four years have already elapsed since the privilege was granted, and we have already seen in this State five steamboats which contribute to give life and prosperity to commerce. Have we not every reason to hope, that in a few years hence, we shall have a sufficient number of them to allow us to carry on with the Western States a trade which cannot fail to be extremely advantageous to this? Hitherto, States that come and bring the fruits of their soil and industry here, used to draw the manufactured goods and colonial prod-

use necessary for their use from the Atlantic ports. But the expenses of transportation are so considerable, that during the late war a great number of barges were employed at a very high rate, to sail up the river to carry to those States the produce of Louisiana, and the goods from foreign importation. Nobody can entertain a doubt, that if the number of steam-boats was sufficient to enable us to supply regularly the countries situate on the western streams, those countries would soon abandon their connections with the Atlantic States, and draw all their wants exclusively from New Orleans. Such an outlet for the commerce of Louisiana is very desirable, and, no doubt, the surest and most efficacious means to attain that end is to encourage the company which may best secure its success. The specie which the people of the western country carry home, and send afterwards to the northward, will all remain here, and we shall soon reach that degree of prosperity which we can only expect from an extensive commerce with the interior of the country.

“Well convinced of the truth of the above statement, your committee could not avoid reflecting upon the motives which had induced this honorable house to pass the resolution offered to them. No doubt, the member who introduced that resolution, must have thought the company had forfeited their privilege by violating some of the provisions of their charter. It, therefore, became the duty of your committee to inquire on that subject. The result of their inquiries has been most favorable to the company. They faithfully abided by the tariff of freight established by the Commissioners, whose names appear at the foot of the annexed certificate, and your committee do not learn that that tariff ever was departed from in any circumstance. That company have scrupulously executed all their obligations. Why should their charter be repealed? Would it not be violating the faith of the State, upon which that company must have relied, when they entered into a speculation, which has, until now, occasioned to them nothing but enormous losses? Would the legislature choose to operate their ruin, at the time when they have been obliged to lay out considerable funds for the re-building of the boat destroyed by fire? Such an act on the part of a private individual would justly be reprobated by the laws: and not a legislature could

be found in any of the United States, so little acquainted with their duties as to consecrate it by a statute.

"Your committee are therefore of opinion, that there is no motive for repealing the law, which grants to that company the exclusive privilege of navigating with steamboats for a limited time.

Signed,

P. L. MOREL,

"Chairman."

While on the subject of the exclusive privilege of Livingston and Fulton to navigate with steam vessels the waters of the Mississippi, it may not be without interest that the following letter will be read, which shows the circumstances that led to the introduction of steam vessels on the western rivers. The writer of the letter was at that time Governor of Orleans:

"New Orleans, January 25th, 1817.

"In reply to your letter of the 22d inst., I can only give you the following statement:

"In the summer of 1810, being in the city of Washington, I became acquainted with the late Mr. Joel Barlow, and had frequent conversations with that distinguished man on subjects of national interest. Mr. Barlow was a great admirer of the talents of the late Mr. Robert Fulton, and believed that the steam navigation, so much improved by Mr. Fulton, could be brought to still greater perfection, and that the day was not far distant when vessels propelled by steam would be employed not only on all the bays and rivers of the United States, but also in the coasting trade. He made inquiries of me as to the difficulties of ascending the Mississippi, and particularly as to the strength of the current in high water. These being answered as far as my personal knowledge allowed me, Mr. Barlow seemed to think that steamboats might be introduced on the Mississippi with a certainty of success. On this point, I expressed some doubts, but accompanied them with a wish to see the experiment made. Mr. Barlow subsequently opened a correspondence with Mr. Fulton on the subject, and it resulted in an invitation from Mr. Fulton to me, that on a tour which I contemplated making through the Northern States, I would take Albany in my way, and ascend the North River in one of the steamboats. In the fall of 1810, I went on to New York,

and the morning after reaching that city finding a boat proceeding to Albany, I took my passage in her. The captain having readily satisfied my inquiries as to the machinery, the force of the steam and the speed of the boat through still water, my doubts as to the practicability of stemming the current of the Mississippi were wholly removed. Returning from the northward, I passed several days in New York, and was much gratified with several interviews which I had with Mr. Fulton and his associate, the late venerable Chancellor Livingston. Those gentlemen were strongly urged by me to introduce the steam navigation on the Mississippi, with assurances of my entire conviction of its success, and the most liberal encouragement. They entertained no doubt as to ultimate success of the experiment, but spoke of the great expenditure and heavy advances with which it would be attended. These they were unwilling to encounter, unless previously assured of the protection of the legislature of the Territory of Orleans. I inquired as to the nature of the protection desired, and was informed: "An exclusive privilege to navigate the waters of the Mississippi, passing through the territory of Orleans, with boats propelled by steam, was the only condition on which they would embark in this enterprise." Much conversation ensued on the same subject, and it resulted in a promise on my part to lay before the territorial legislature a petition from Messrs. Livingston and Fulton, requesting the exclusive privilege, and a promise on their part, that if it were granted them by an act of the legislature, one or more steamboats should be sent to New Orleans as speedily as they could be built.

"In January, 1811, I had the petition before the territorial legislature, and recommended it to their early and respectful consideration. The act, entitled "An act granting to Robert R. Livingston and Robert Fulton this sole privilege of using steamboats for a limited time in the territory," was passed on the 19th day of April, 1811. An attested copy of this act I immediately transmitted to Messrs. Fulton and Livingston, who, in fulfilment of their promise, did, in the winter of 1812, send to New Orleans the steamboat "New Orleans," and subsequently three others. Shortly after the arrival of the first boat, a committee of five respectable merchants in the city of New Orleans was assembled by me for the purpose of ascer-

taining whether the requisites of the law had been complied with, and, further, to fix the rate of freight which, under a particular provision of the law, the boats might exact.

"The committee reported favorably, and settled a standard of freight, which I handed to the agent of the boat for his government.

"Such are the facts, as far as related to my agency, and you are at liberty to use them as you shall think proper. I am, Sir, very respectfully, your obedient servant,

"W. C. C. CLAIBORNE.

"J. Lynch, Esq., New Orleans."

The first towboat in service on the Mississippi River was at New Orleans, in November, 1815, for towing vessels from the mouth of the river up to the city, which took them two to three days to perform.

In the summer of 1816, the "Oliver Evans," of 75 tons, was built at Pittsburg, Pa. She was 122 feet long, and a side-wheeler, and was considered a very fine boat of her day on the Ohio and Mississippi Rivers. Her name was a short time after changed to the "Constitution." On May 4th, 1817, while on a trip up the Mississippi River, and opposite Point Coupee, her boiler exploded, resulting in the loss of eleven lives and about twenty being very seriously scalded.

In 1818, the "General Pike" was built at Cincinnati, Ohio. She was 100 feet keel, 25 feet beam, and about 6 feet hold. She had a spacious cabin for a small boat, and was well furnished with passenger accommodations for those days: was run between Cincinnati and Louisville in 1819, and was commanded for a portion of the time by Capt. Nezhiah Bliss, who was in after years interested in steam navigation in the waters of New York, and one of the founders of the Novelty Iron Works at New York City.

About 1820, there were six or eight boats, of about 200 tons each, built at New York and at Philadelphia, and sent to New Orleans under their own steam. There was one built at New York in 1824, named "Post Boy," for towing, that had a beam engine with a steam cylinder connected at each end of the beam, and having pistons of 6 feet stroke. This was the first of that type "high and low-pressure" engines built in this

country, or as called at this day, compound engines. The Al-laire Works was the constructor.

A majority of the first-class steamboats in these early days were commanded by imported ship captains, from the Atlantic Coast, or Gulf of Mexico ports, and but few of them succeeded with the wild-western boatmen, who thought those far-fetched sailors were tyrannical and put on too many airs. The captain, when his vessel was ready to leave on her trip, would mount to the highest point of observation on his vessel toward the wharf, and from there would give his orders to those under his command through a small metal trumpet (generally of brass), which he carried in his hand. In fact, this custom was handed down, but it is many years since it was practised on the western rivers, as well as along the Atlantic Coast. The crews handled their cargoes without much hired outside help. The forecabin was the eating and sleeping place for the deck hands, and it was comfortable and clean. It was common for a crew of deck hands to remain on a boat the whole season, and at a subsequent date they made good pilots and mates; also many firemen, favorites of the engineers, became good engineers. It was not thought important, at that time, for an engineer to have a classical education, as the builder of the engines in those days set the cams and marked the safety-valve lever. An intelligent fireman soon learned how to line the shafts, how to keep the furnaces in order, and the right quantity of water in the boiler. That was about all that was expected of engineers for high-pressure engines in those days.

All these vessels, up to about 1830, were built heavy in the hull like a sailing vessel, and a great many were fitted even with bowsprits and figure-heads. In making landings at any point where there were other vessels, they had to be carefully handled to prevent doing damage with their bowsprits. They could not land head on, as done at a later period when this fixture had been dispensed with, but would come in slowly, sideways, and thus avoid piercing the joiner work or rails of any vessels lying at the landing.

There had been a custom prevailing on very many of the river boats, of the barkeeper furnishing the dinner table with spirituous liquors, brandy, whiskey, gin, and wines, when on a trip for the use of the passengers and also the crew up to

about 1838, and, in addition, the officers were permitted to have all the liquor they desired to partake of at the bar on board the boat, and the crew were furnished with a certain quantity while on duty. These were in payment of the privilege of a bar.

In a report of the Secretary of the Treasury, of 1838, to the House of Representatives on steamboats, etc., there are reports received from several districts, a few of which from the Western States mention the use of spirituous liquors on steamboats by the officers and crew, in the following language: From Louisville: "There is a practice in all the boats on the western and southwestern waters of serving out to the crews intoxicating liquors: there is not believed to be a single exception." From the Mississippi District: "The use of spirituous liquors on board of boats is universal in this trade." Wheeling District, referring to engineers of stationary engines, "that they are always conducted by temperate engineers, which is not often the case in regard to boats." The use of intoxicating liquors by the officers and crew of steamboats, at this date, was not confined to those employed on the western rivers, but the practice existed in a more modified form on the Atlantic Coast, and there does not appear to be any record that the owners of these steamboats allowed their officers and crew that freedom in the use of spirituous liquors while on duty that existed on the western river steamboats. It is not to be denied that there were accidents on the Atlantic Coast, involving the loss of life, but it was not attributed to the use of liquors by the officers or crew.

In 1834, Louisiana passed a law for the inspection and government of steam vessels entering or plying on the waters of that State. This was brought about by an explosion of a quantity of gunpowder, which was being transported as freight on the "Lioness," in 1833, when forty miles above Alexandria, on the Red River, resulting in the death of fourteen persons and injuring twelve others, among the former being the member of the U. S. Senate from Louisiana. The law established the office of State Engineer, whose duty it was to examine once in every three months the strength of the boilers of the steamboats within the jurisdiction of the State; to test them by hydrostatic pressure to three times the pressure of steam they

were supposed to carry. In case of accident, the boat, not possessing the proper certificate, neither captain, owner, or agent could recover any claim for freight; and the captain was subject to a fine of not less than \$500.00, nor more than \$2,000.00, and to imprisonment for not less than three months, nor more than three years. If lives were lost, the captain was to be adjudged guilty of manslaughter. The same penalties were provided in case of any accident in navigation; for overloading, racing, carrying higher steam than the certificate allowed, or any accident that might occur while the captain, pilot, or engineer was engaged in gambling, or attending to any game of chance or hazard. There was a rule also made as follows: In passing up the river, the descending boat was commanded to shut off steam and float down, when within a mile of the ascending boat, the latter to assume the responsibility of keeping clear of the descending boat, and to be held liable for any damage occurring from collision.

In the matter of rates of freight, etc., on the early steamboats on the western waters, the following copy of an affidavit made at the time the claim of the heirs of Robert Fulton was before the United States Congress, and which was a part of the papers forming the claim, will be accepted as authoritative on the subject.

"I, Jasper Lynch, of the city of New York, having been requested, in behalf of the heirs of the late Robert Fulton, to state, under oath, first the facts within my knowledge as to the seizure and impressement of the steamboat "Vesuvius" for the use of the government at the invasion of New Orleans in 1814; and, second, my opinion as to the probable loss to her owners by the detention occasioned in consequence of her grounding while in the public service, and being duly sworn, do depose and say: That I visited New Orleans for the first time in the spring of 1816, and, of course, know nothing personally in respect to the fact of the seizure and detention of the boat in 1814.

"I went to New Orleans, as sole agent of the steamboat "New Orleans," trading between New Orleans and Natchez, and shortly after my arrival there, became the sole agent of the steamboat "Vesuvius" above mentioned, which two boats I employed on the river until the autumn of 1818, with the ex-

ception of an interval of about eight months, during which I rebuilt the "Vesuvius," which was burned in 1816, after she came into my possession, and the ownership thereby cast on me.

"It would, in my opinion, be difficult to assign a limit, preserving the appearance of credibility, to the amount of money which the steamboat "Vesuvius" might have earned, if afloat during the season of navigation and business, from November, 1814, to July, 1815, before and after the scene of bustle growing out of the invasion of New Orleans. I should not estimate it at less than \$100,000. This, I am aware, will appear extravagant to those unacquainted with the prices of freight and passage on the Mississippi, and the situation of New Orleans at that time. Application has been made to me for the last two or three years, for a written statement under oath, on this subject. I have been averse to making it, because I knew, unaccompanied by the facts and reasons from which I deduced my estimate or conclusion, it might bear the stamp of extravagance or improbability. I had hoped that an opportunity might be afforded of giving testimony orally, and of explaining them more fully and satisfactorily than could be done on paper. In justice, therefore, to myself, as well as for the information of those whom it may concern, I will now state them.

X "On my arrival in New Orleans, in 1816, I found the following prices of freight in steamboats on the Mississippi established, I believe, by the legislature of Louisiana in 1812:

"From New Orleans to Louisville, $4\frac{1}{2}$ cents per pound for heavy goods, and 6 cents for light, averaging 5 cents per pound, or per ton, \$112.00.

"From New Orleans to Natchez, $\frac{3}{4}$ of a cent per pound, or \$1.50 per barrel: and the same rates were charged for all the intermediate landings—Donaldsonville, 75 miles; Baton Rouge, 120 miles, etc., or per ton, \$15.00.

— "From New Orleans to Louisville, passage, \$125.00X

"From New Orleans to Natchez, passage, \$30.00. And half price for passage down.

"These rates continued uniform; I never received less, and they were not reduced till 1819.

"The tonnage of the 'Vesuvius' was, as nearly as I can

recollect, 394 tons (Custom House), and she carried over 1,300 bales of cotton, averaging 400 pounds each. She was, at that time (1814), a new boat just from Pittsburg, and the only steamboat at New Orleans, or indeed on the river and, of course, without competition as to freight or price; her speed through the water was eight miles an hour. From these facts an estimate may be made of the amount she could have earned. A boat of the same tonnage, at the above rates, without competition and under like circumstances on the Hudson, would, I have no doubt, greatly exceed the estimate I have made. The cases are not dissimilar. I employed this boat between New Orleans and Louisville during the seasons of 1817 and 1818, at the above rates. I have not at present the advantage of reference to my books; but I well recollect that one trip made in the spring of 1817, from New Orleans to Louisville and back, she was absent from New Orleans about forty days, and her returns were about \$800 a day for the whole time."

"JASPER LYNCH."

"Rome, Oneida Co., N. Y., Feb'y 29, 1836."

In a report made by the Secretary of the Treasury, on December 12th, 1838, by request of the House of Representatives, for information regarding steamboats, causes of explosions, etc., the following regarding the progress of steam navigation of western rivers appears as a portion of the report:

"On the western and southwestern waters alone, near 400 are now supposed to be running, where none were used till 1811, and where, in 1834, the number was computed to be only 234. Of these 400, about 141 are estimated. On the Ohio River alone, in 1837, about 413 different steamboats are reported to have passed through the Louisville and Portland Canal, besides all below and above, which never passed through. But it deserves notice that of those 413, nearly 60 went out of use by accidents, decay, etc., within that year, and several of the others, viz.: 104 were new, and many of them probably were destined to run on other rivers. As an illustration of the rapid increase in business in steamboats on the Ohio, the number of passages by them through the Louisville Canal increased from 406, in 1831, to 1,501, in 1837, or

nearly four-fold in six years. The largest boats passing Louisville, in 1837, were the "Uncle Sam," of 447 tons, and the "Mogul," of 414 tons; though below Louisville, the "Mediterranean," of 490 tons, and the "North America," of 445 tons, on the Ohio, and the "St. Louis," of 550 tons, on the Mississippi, are running. The greatest loss of life, well authenticated on any one occasion in a steamboat, appears to have been by collision and consequent sinking in the case of the "Monmouth," in 1837, on the Mississippi River, by which 300 lives were lost. The next greatest were by explosions—of the "Oronoko," in 1838, on the same river, by which 130 or more lives were lost, and of the "Moselle," at Cincinnati, Ohio, by which 100 to 120 persons were destroyed. The greatest injury to life, by accidents to boats from snags and sawyers, appears to have been 13 lost in 1834, in the case of the "St. Louis" on the Mississippi River."

David Stevenson, an English engineer, in 1838, says of steam navigation on western rivers: "Most of the vessels at present employed have been built on the banks of the Ohio, and a few at St. Louis, on the upper part of the Mississippi, but the building yards which have produced the greatest number are those of Pittsburg and Cincinnati, on the Ohio. Pittsburg, although about 2,000 miles from the Gulf of Mexico, is a place of great trade. Its population is 30,000 persons, a great part of whom are employed in the construction and management of steamboats, and some idea may be formed of the extent of their trade, when I state that I have counted no less than thirty-eight steamboats moored opposite the town in the Monongahela, all of which were engaged in plying to and from the port. X

"The vast number of vessels on the western waters, the peculiarity of their construction, and the singular nature of the navigation of which they are employed, make them objects of considerable interest to the traveler. We must not expect to find, however, in that class of vessels the same display of good workmanship, and the attainment of the high velocities which characterize the vessels on the eastern waters. These qualifications may be easily dispensed with, and the want of them is by no means the worst feature in the western navigation; but, what is of far more importance, too many of the ves-

sels are decidedly unsafe, and, in addition to this, their management is intrusted to men whose recklessness of human life and property is equalled only by their ignorance and want of civilization.

"Economy would indeed seem to be the only object which the constructors of these boats seem to have in view, and, therefore, with the exception of the finery which the cabins generally display, little care is expended in their construction, and much of the workmanship connected with them is of a most superficial and insufficient kind. When the crews of these frail fabrics, therefore, engage in brisk competition with other vessels, and urge the machinery to the utmost extent of its power, it is not to be wondered at that their exertions are often suddenly terminated by the vessel taking fire and going to the bottom, or by an explosion of the steam boilers. Such accidents are frequently attended with an appalling loss of life, and are of so common occurrence that they generally excite little or no attention. A steamer called the "Ben Sherrod" was burned on the Mississippi, when 120 persons were reported to have lost their lives. I am happy in being able to add, that there is reason to believe that in consequence of this accident, the Government of the United States have resolved to take some measures to insure the better regulation of this navigation, which has been too long neglected by them.

"The vessels on the western waters vary from 100 to 700 tons burden, and are generally of a heavy build to enable them to carry goods; they have a most singular appearance, and are no less remarkable as regards their machinery. They are built flat in the bottom, and generally draw from six to eight feet of water. (?) The hull is covered with a deck at the level of about five feet above the water, and below this deck is the hold, in which the heavy part of the cargo is carried. The whole of the machinery rests on the first deck; the engines being placed near the middle of the vessel, and the boilers under the two smoke chimneys. The fire-doors open towards the bow, and the bright glare of light thrown out by the wood fires, along with the puffing of the steam from the escapement pipe, produce a most singular effect at night, and serve the useful purpose of announcing the approach of the vessel when it is still at a great distance. The chief object in placing the

boilers in the manner described, is to produce a strong draught in the fireplace. The other end of the lower deck, which is covered in, and occupied by the crew of the vessel and the deck passengers, generally presents a scene of filth and wretchedness that baffles all description. A staircase leads from the front of the paddle boxes on each side of the vessel, to an upper gallery about three feet in breadth. This surrounds the whole after part of the vessel, and is the promenade of the inhabitants of the second deck. Several doors lead from the gallery into the great cabin, which extends from the funnels to within about thirty or forty feet of the stern of the vessel: the aftermost space is separated from the great cabin by a partition, and is occupied by the ladies. The large cabin contains the gentlemen's sleeping berths, and is also used as a dining room. This part of the western steamers is often fitted up in a gorgeous style; the berths are large, and the numerous windows by which the cabin is surrounded give abundance of light, and what is of great consequence in that scorching climate, admit a plentiful supply of fresh air.

"From the gallery surrounding the chief cabin, two flights of steps lead to the hurricane deck, which in many of the steamers is at least thirty feet above the level of the water. The wheelhouse in which the steersman is placed, is erected on the forepart of this deck, and the motion is communicated to the helm by means of ropes or iron rods, as in the eastern steamers.

"The first cabin of a Mississippi steamboat is strangely contrasted with the scenes of wretchedness on the lower deck, and its splendor serves, in some measure, to distract the attention of its unthinking inmates from the dangers which lie below them. But no one who is at all acquainted with the steam engine, can examine the machinery of one of those vessels, and the manner in which it is managed, without shuddering at the idea of the great risk to which all on board are every moment exposed.

"The western water steamers are propelled sometimes by one, and sometimes by two, engines. When two engines are used the ends of the piston rods work in slides, and the connecting rods are both attached to cranks on the paddle-wheel axle, placed at right angles to each other, as is the case in

most of the steamers in this country. When only one engine is used, which is more generally the case, a large fly wheel, from ten to fifteen feet in diameter, is fixed on the paddle-wheel shaft, and serves to regulate the motion of the engine, and enable it to turn its centres. The cylinders are invariably placed horizontally, and the engines always constructed on the high-pressure principle.

"The engines are generally very small in proportion to the size of the vessel which they propel, and to make up for their deficiency in volume, they are worked by steam of great elasticity. The "Rufus Putnam," for example, a pretty large vessel, drawing three feet of water, which plies between Pittsburg on the Ohio, and St. Louis on the Mississippi, is propelled by a single engine having a cylinder 16 inches diameter, and 5 feet 6 inches in length of stroke, but this engine is worked by steam of a most dangerously great elasticity. The captain of the vessel informed me that under ordinary circumstances the safety valves were loaded with a pressure equal to 138 pounds on the square inch of surface, but that the steam was occasionally raised as high as 150 pounds to enable the vessel to pass parts of the river in which there is a strong current: and he added by way of consolation, that this amount of pressure was never exceeded, except on extraordinary occasions! I made a short voyage on the Ohio in this vessel, but after receiving this information, I resolved to leave her on the first opportunity that presented itself.

"The 'St. Louis,' one of the newest boats on the Mississippi, is 230 feet in length on deck, and 28 feet in breadth of beam. She draws 8 feet of water and carries about 1,000 tons. This vessel is propelled by two engines, with cylinders 30 inches in diameter and 10 feet in length of stroke, worked by steam having a pressure of 100 pounds on the square inch of the boilers.

"Explosions, as may naturally be supposed, are of very frequent occurrence; and, with a view to cure this evil, several attempts have, at different periods, been made to introduce low-pressure engines on the western waters, but the cheapness of high-pressure engines and the great simplicity of their parts, which require comparatively little fine finishing and good fitting, certainly afford reasons for preferring them to low-pressure engines, in a part of the country where good

workmen are scarce, and where the value of labor and material is very great. It must also be recollected, that a condensing or low-pressure engine, takes up a great deal more space than one constructed on the high-pressure principle. I do not apprehend, however, that the number of accidents would be diminished by the simple adoption of low-pressure boilers, without the strict enforcement of judicious regulations, and if those regulations were properly applied to high-pressure boilers, they would not fail to render them quite as safe as those boilers which are generally made for engines working on the low-pressure principle. One very obvious improvement on the present hazardous state of the Mississippi navigation, would be the enactment of a law that a pressure of steam should in no case exceed perhaps 50 pounds on the square inch.

"The boilers of these steamers are all tubular, and have circular flues in them which permit the passage of the flame through the body of the boiler. Those of the "St. Louis" are nine in number; they are 42 inches diameter and 24 feet in length; two circular flues, 16 inches in diameter, pass through the interior. The whole of the flues and outercoating of the boiler are made of sheet iron three-sixteenths of an inch in thickness, and the end plates are formed of materials of greater strength. The boiler is strengthened by numerous internal ties, or braces, and is calculated to sustain a pressure of 100 pounds on the square inch of surface. The only protection which the boilers have from the atmosphere is a layer of clay, with which they are in all cases covered, to prevent the radiation of heat.

"The steamers make many stoppages to take in goods and passengers, and also supplies of wood for fuel. The liberty which they take with their vessels on these occasions is somewhat amusing, and not a little hazardous. I had a good example of this on board of a large vessel, called the "Ontario." She was sheered close in shore among stones and stumps of trees, where she lay for some hours taking in goods. The additional weight increased her draught of water and caused her to heel a great deal, and when her engines were put in motion, she actually crawled into deep water on her paddle wheels. The steam had been got up to an enormous pressure to enable her to get off, and the volumes of steam

discharged from the escapement pipe at every half-stroke of the piston, made a sharp sound, almost like the discharge of firearms, while every timber in the vessel seemed to tremble, and the whole structure actually groaned under the shocks.

"During these stoppages, it is necessary to keep up a proper supply of water to prevent explosion, and the manner in which this is effected on the Mississippi is very simple. The paddle-wheel axle is so constructed that the portions of it projecting over the hull of the vessel to which the wheels are fixed, can be thrown out of gear at pleasure by means of a clutch on each side of the vessel, which slides on the intermediate part of the axle, and is acted on by a lever. When the vessel is stopped, the paddle wheels are simply thrown out of gear and the engine continues to work. The necessary supply of water is thus pumped into the boiler during the whole time that the vessel may be at rest, and when she is required to get under way, the wheels are again thrown into gear and revolve with the paddle-wheel shaft. The fly wheel, formerly noticed, is useful in regulating the motion of the engine, which otherwise might be apt to suffer damage from the increase and diminution in the resistance offered to the motion of the pistons, by suddenly throwing the paddle wheels into and out of gear. The water for the supply of the boiler is first pumped into a heater, in which its temperature is raised, and is then injected into the boiler.

"I saw several vessels on the Ohio, which were propelled by one large paddle wheel placed at the stern of the vessel, but it is doubtful whether this arrangement is advantageous, as the action of the paddle wheel, when placed in that situation, must be impeded by the floatboards impinging on water which has been disturbed by the passage of the vessel through it.

"The Mississippi steamers carry a captain, clerk, two engineers, and two pilots, one of whom is always at the helm. The fireman and the crew are people of color, and generally slaves. The passage from New Orleans to Pittsburg, against the current of the river, is generally performed in from 15 to 20 days, and from Pittsburg to New Orleans in about 10 days: the distance is rather more than 2,000 miles, and the cabin passage, including all expenses, is about \$50.00."

The Baron De Gerstner, traveling through the United States about 1840, says:

“The largest shipyards are at Louisville, New Albany, Cincinnati, Pittsburg and St. Louis. Upon the Ohio River, stone coals are now brought by steamboats two hundred and fifty miles down to Cincinnati; or, rather, the flatboats loaded with coal are taken in tow and brought down the river by steamboats, and the empty barks taken back in the same way, because the cost of transportation is found to be less in this manner. It is true, the extremely high wages of the boatmen and all other laborers, contribute much to this extraordinary result, but, as I shall have occasion to show hereafter, the crew of a steamboat is also very well paid, and it is to be ascribed entirely to the perfection in the construction of the vessels, and the engines used in them, and in the application of steam, as also to the improved arrangements in the steamboats generally, that they have produced in America the results which have been arrived at neither in England, nor in any other part of Europe.

“The Americans boast of a system of navigable streams in the Southern and Southwestern States, not to be met with in any other country of the globe; they maintain that the length of the Mississippi, with the Ohio and all other tributary streams, comprises an extent of 100,000 miles (?) of waters navigable by steamboats. I would not answer for the correctness of this number, but the Mississippi alone is navigated by steamboats from New Orleans, under the thirtieth degree, to the Falls of St. Anthony, under the forty-fifth degree of North latitude, a distance of not less than 2,000 miles, and the number of navigable tributary streams of the Mississippi is indeed so large, that a European, who is accustomed to our short travels by steamboats, can only, by being an eye witness, conceive the magnitude of the system of steam navigation in this country. > There are daily at least four or five steamboats starting from New Orleans for Pittsburg in the business season, and as many arrive daily. The distance is 2,000 miles, or two-thirds of that from England to New York across the Atlantic, and, nevertheless, the voyage is regarded as nothing extraordinary, and is undertaken after a few hours preparation.

"The steamboats in the West, or upon the western waters, are throughout very flat, and go, when loaded, generally five feet deep; some, however, only thirty to thirty-six inches. When the water in a river is only thirty inches deep, the steamboat contains only the engine and fuel and the cabins for the men, and flatboats loaded with goods are taken in tow. The passenger boats have two decks, the upper one is for the cabin passengers. The elegant boats contain a large, splendidly furnished and ornamented saloon, used as the dining room, and an adjoining saloon for the ladies. The saloons are surrounded by small apartments (state rooms), each of which contains two berths, and round the state rooms is an open gallery, to which a door opens from each state room. Such a vessel offers to a European an imposing and entirely novel aspect. All steamboats upon the western waters have high-pressure engines, the pressure of steam being from 60 to 100 pounds per square inch. Often two engines are used in a boat, and then each engine propels one of the paddle wheels. The cylinders are horizontal, the stroke is 8 to 10 feet, and the steam is generally cut off at five-eighths of the stroke, and then operates by expansion. The escaping steam is applied to heat the water pumped from the river before it gets into the boiler.

"In the year 1818, a cabin passenger paid for a passage in a steamboat, from New Orleans to Louisville, a distance of 1,450 miles, \$120, and for returning, \$70; the passage up took 20 days and down 10 days; at present, cabin passengers pay in the most elegant steamboats, \$50 for a passage up, and \$40 for one down stream, while they go up in six, and down in four days. The charges include boarding, which, considering the abundance and choice of victuals, &c., ought to be estimated at \$2.00 per passenger per day. The fare is, therefore, now, for the passage alone, taking the average between a trip up and down (excluding board), 2.41 cents per mile. Less elegant boats take cabin passengers up in eight days for \$30, and for \$25 down in five days, which, after deducting \$1.50 per day for board, gives only 1.22 cents per mile at an average between a trip up and down.

"Upon the lower deck of these steamboats, which is a few feet above the surface of the water, are the deck passengers,

who provide their own meals, and pay for the same passage of 1,450 miles only \$8.00; if they assist the crew in carrying the wood upon the boat, they pay only \$5.00. In the former case they pay, therefore, per mile, 0.55 cents.✕

“Merchandise was carried before the introduction of steam navigation in sailing vessels, which took a load of 150 tons,✕ in the year 1817, the charge for freight per pound, from New Orleans to Louisville, was seven to eight cents; in 1819, the steamboats commenced carrying freight, and immediately reduced the charge to four cents per pound. At present, the charges per one hundred weight, from New Orleans to Louisville, are, according to the quality of the goods and the season, at least 33 cents, and the most \$1.50. At an average, they may be taken at $62\frac{1}{2}$ cents for the distance of 1,450 miles. This makes 86 cents per ton per mile.✕

✕“Between Cincinnati and Louisville, the first steamboat, “General Pike,” was put in operation in 1819, and made weekly a voyage down to Louisville, 150 miles, in 18 hours, and up again to Cincinnati in 40 hours. A cabin passenger paid at that time \$12 for a passage. At present, the steamboats have so much increased in number that at least six boats are daily starting from and arriving at Cincinnati or Louisville. Upon the finest boats, as, for instance, the “Pike” and “Franklin,” the fare is \$4.00, and the time occupied in going up is, including all stoppages, 15 hours, and in going down only 11 hours; but these boats have frequently made a passage up in 12, and a passage down the river in $7\frac{1}{4}$ hours; in the latter case, the speed was, therefore, over 20 miles per hour. If \$1.00 be deducted for board, there remain \$3.00 for a passage, which is at the rate of two cents per mile. The deck passengers, who assist in taking in wood, pay only \$1.00, or two-thirds of a cent per mile, and find their own victuals. For merchandise, the charges are 15 cents per one hundred weight, or two cents per ton per mile.✕

✕“From Cincinnati to St. Louis, the voyage is 538 miles down the Ohio, and 192 miles up the Mississippi, making, together, 730 miles. The passage to St. Louis, or from there back, is performed in four days. A cabin passenger pays \$12.00, of which we ought to deduct at least \$4.70 for board; this leaves only one cent per mile for the passage alone. The

deck passengers pay \$4.00, without board, which makes nearly one-half cent per mile. Goods pay at an average, 50 cents per one hundred weight, \$1.37 per ton per mile.

X "But three years ago, eight days were required for a trip from New Orleans to Louisville, which is now regularly performed in six. The most remarkable result is, that a boat of 400 tons required, 20 years ago, for this voyage of 1,450 miles, 360 cords of wood, while at present, for a six days' passage, only the same quantity of wood is required.

"What appears most striking is, that while the charges for transportation have been constantly *reduced* during 20 years, wages and the prices of all commodities *rose* from year to year. The captain of a steamboat received, 20 years ago, a salary of \$1,000 per year, now he gets upon the better boats \$2,000. Every steamboat has two pilots, who change every four hours: each of them received, in 1822, only \$60 per month, but since that time their salary has risen, and was, in 1833, \$300, which is still now paid to the pilots of the best boats. There are also two engineers upon each steamboat, their salary was, in 1822, only \$40 per month, and rose in consequence of the great demand for engineers to \$100 and \$150. The fireman and common laborers received, 20 years ago, only \$14 per month, and now get \$30 to \$40. The whole crew besides have free board upon the steamboats. The provisions necessary for the nourishment of the passengers upon the steamboats have risen in price, during the last five years, 33 per cent.

"The steamboats upon the western waters use almost exclusively wood as a fuel, which, 20 years ago, was quite valueless; in 1834, it sold on the Ohio and Mississippi for \$1.75 to \$2.00 per cord, and costs at present \$2.25 to \$3.50. The price has, therefore, increased in the last five years about 50 per cent.

"The steamboats upon the western waters, whose plan of construction might be adopted to great advantage upon our rivers in Europe, are principally constructed in Louisville, Cincinnati and Pittsburg. Generally, the hull of the vessel is built by ship carpenters, the steam engine delivered from a manufactory and put on the boat, after which the joiners build the cabins and finish the whole. Three different classes of

mechanics are, therefore, required, with whom separate contracts are made. There are, however, individuals who undertake the building and furnishing of a whole steamboat by contract. As the prices differ much, according to the solidity and elegance of the vessels, the cost of some of the vessels is given, which are among the best.

X "Between Cincinnati and Louisville, the two steamboats, "Pike" and "Franklin," make regular trips, carrying the United States mail; one of the two goes daily up, and the other down the river. The "Franklin" is 183 feet in length on her deck, and the extreme width is 25 feet, the depth of hold, or the distance from the keel to lower deck, is $6\frac{1}{2}$ feet. The tonnage 200 tons. Upon the upper deck are 42 state rooms, each with two berths, making in all 84 berths; but mattresses are laid upon the floor of the dining room when required, and 150 cabin passengers may sleep upon the boat. The boat is propelled by two engines; the pressure of steam is 80 pounds per square inch, the diameter of the cylinders, which are in a horizontal position, is $25\frac{1}{2}$ inches, the stroke being seven feet. The steam is cut off at five-eighths of the stroke, and acts through the remaining three-eighths by expansion. The diameter of the paddle wheels is 22 feet, their width 11 feet, the dip is 22 inches; the paddle wheels generally make 28 revolutions in a minute; the length of the connecting rod is 23 feet. There are six boilers of wrought iron on board the boat, each 23 feet in length, and 60 inches in diameter; each boiler has two flues of 15 inches diameter.

At an average, the steamboat carries 125 passengers, one half in the cabins, and the other half on deck, and, besides, 25 tons of goods. X With this load, she draws six feet of water. The boat was constructed in the year 1836, and the cost was:

For the hull, at \$25.00 per ton.....	\$5,000
" two steam engines.....	12,000
" joiners' work for cabins.....	4,000
" draperies, mirrors, bedding and other furniture in the state rooms, saloons and kitchen.....	9,000
Total	\$30,000

"This boat is, as observed, one of the most solid and elegant: other steamboats of the same dimensions have cost \$5,000 to \$6,000 less.

✕ Among the steamboats of the largest class, which run only between New Orleans and Louisville, the "Sultana" and the "Ambassador," are now much favored by the public. The "Ambassador" has 215 feet length of deck, and 35 feet extreme breadth; her tonnage is 450. On the upper deck are 44 state rooms, each with two berths, but as many beds may be arranged upon the floor of the saloon. Of the two steam engines, each has a horizontal cylinder of 25 inches diameter and 8 feet stroke. The steam acts with a pressure of 90 pounds per square inch, and is cut off at five-eighths of the stroke. The diameter of the paddle wheels is 22 feet, and their width 12 feet. ✕ The boat generally carries 200 tons of goods up, and 300 tons down stream, besides 100 cabin and 150 deck passengers. ✕ She draws light five feet, and when loaded seven feet of water. The hull of this boat has cost \$12,000, the engines \$17,000, the joiners' work and the whole interior arrangement of this highly elegant structure amounted to \$31,000, making the cost of the whole boat \$60,000. It must, however, be observed that great and costly alterations were made during the construction, so that her cost would not actually exceed \$55,000.

"Well-informed individuals, who are very much interested in the subject of steam navigation, estimate the average cost of a steamboat, upon the western waters, after a special calculation, at \$23,500.

"The expenses incident to the management of steamboats consist in the salaries and wages of the individuals employed, the cost of fuel (wood), of the victuals for the cabin passengers and crew, and in the cost of repairs of the boat and engines.

"I have already mentioned the extraordinary rise in wages, which took place during the last few years. The cause of it lies principally in the considerably increased number of steamboats, and the want of useful individuals, as also in the universal rise of prices of all articles in the United States. The payment to the officers and crew of the "Franklin" is per month, as follows, viz.:

1 Captain and 2 Clerks.....	\$200
2 Pilots	200
2 Engineers and 2 Assistants.....	250
2 Mates	80
1 Carpenter	30
2 Cooks	80
1 Steward and 6 Waiters.....	140
1 Chambermaid	20
10 Fireman	200
6 Common Laborers.....	120

38 Persons.....Total..... \$1,320

Add for 785 cords of wood, and a few tons
of coal 1,775

For provisions for 62 cabin passengers and
38 men belonging to the boat, together
for 100 persons..... 1,400

Total expenses, without repairs..... \$4,495

or nearly \$4,500 per month. During nine months in the year, the boat makes daily a trip of 150 miles, together, 40,500 miles per year. During the remaining three months, she is laid by on account of the low stage of water in the river. She then is newly caulked, painted, and receives all the necessary repairs. The latter amount, with a new boat of this class, to not more than \$3,000 in the first year, to which an amount has to be added for general depreciation, which is considerable. The timber, of which the vessels are constructed here, is grown so fast under a warm climate, that a vessel seldom lasts over six or seven years; but steamboats of the first-class are used only four years, and then sold, and the new proprietor continues to employ the boat for a few years longer, but her voyages are so uncertain. 25 per cent. of the original cost must, therefore, be taken as the amount for depreciation in the first year, which makes \$7,500 for the steamboat "Franklin." At the end of the first year, the value of the boat is, therefore, only \$22,500. In the second year, 25 per cent. of these \$22,500, or \$5,625 are taken for the general depreciation. But the repairs in the second year amount to so much more, that their cost, together with the sum for general de-

preciation, is again equal to \$10,500, as in the first year. The same calculation is applicable for the third and fourth year, after which the value of the boat remains only \$9,492, for which amount it is then sold.

We have, therefore, the following, as the yearly expenses for the steamboat "Franklin":—

Current expenses during 9 months' running time	\$40,500
During the remaining three months, the salary of the captain and clerks, who remain on the boat, while the others are dismissed, amounts to.....	1,000
Repairs and general depreciation.....	10,500
Insurance, 7 to 9 per cent. on three-fourths of the value, to which steamboats can only be insured.....	1,350
Sundry small expenses.....	1,150

Total	\$54,500
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If from this sum be deducted the expenses for boarding the passengers and servants, say about.....	\$14,000
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There remains as the expenses for running the boat alone..... \$40,500

As this steamboat performs during nine months, daily, 150 miles, or, in the whole, 40,500 miles, the expenses for every mile the boat travels amount to \$1.00.

On the other side, the revenues of this boat are at an average for each trip of 150 miles:

From 62 Cabin passengers, at \$4.00.....	\$248
" 63 Deck " " \$1.00.....	63

125 passengers, at an average per trip.

For 25 tons of goods, at \$3.00.....	75
" transportation of U. S. Mail.....	4

Total	\$390
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"The amount of \$4.00, received for transporting the mail 150 miles, is here very small. The reason is that the public prefer the mail boats to all others, on account of their safety and punctuality, in consequence of which steamboat proprietors contract for the carrying of the mail, even at the very lowest prices. The income of \$390 per day gives, for the nine months, \$105,300, which, compared with the expense of \$54,500, shows an annual profit of \$50,800. As the "Franklin" has only cost \$30,000, we see what an enormous profit those steamboats yield in America, which are frequented by a sufficient number of passengers.

"The steamboat "Ambassador," the tonnage of which is twice as great as that of the "Franklin," commenced her trips late in the fall of 1837, and made in that year four voyages from Louisville to New Orleans, each of 1,450 miles, and four voyages back, together, therefore, running a distance of 11,600 miles. The monthly expenses were \$8,500, which gives for three months \$25,500, or per mile of travel, \$2.20. In the year 1838, the "Ambassador" made ten trips from Louisville to New Orleans, and back, and performed, therefore, 29,200 miles within the period of eight months, the trips having been discontinued during four summer months, on account of low water. The total expenses for the whole year amounted to something over \$58,000, which gives \$2.00 as the expense for running one mile. The salaries upon this boat amount, in consequence of her large size, and the long trips, to much more than upon the "Franklin," and are as follows, viz.:

1 Captain receives per year.....	\$2,000
1 First Clerk.....	1,200
1 Second Clerk, \$50 per month, therefore, in 8 months	400
1 Barkeeper, \$45 per month, therefore, in 8 months..	360
2 Pilots, each \$300 per month, therefore, in 8 months	4,800
2 Engineers, each \$150 per month, out of which he has to pay his Assistant, both in 8 months.....	2,400
2 Mates, one \$75 and one \$50 per month, therefore, both in 8 months.....	1,000
1 Ship Carpenter, \$60 per month, therefore, in 8 months	480
Carried forward.....	\$12,640

Brought forward.....	\$12,640
2 Cooks, one \$50, the other \$30 per month, therefore in 8 months	640
1 Steward, \$85, and 6 Waiters, each \$25 per month, therefore in 8 months	1,880
1 Chambermaid, \$25, and 1 Washwoman, \$20 per month, both in 8 months.....	360
16 Firemen, each \$35, all in 8 months.....	4,480
8 Common Laborers, each \$25, all in 8 months.....	1,600
48 individuals receive in total.....	\$21,600

"As they have, at the same time, free board on the steamboat, it is evident that the expenses for the persons employed on the boats are much larger here, than in any part of Europe. The expense of \$2.00 per mile of travel includes the cost for board of the passengers, but, at the same time, no sum for general depreciation has been taken into account. These amounts will very nearly counterbalance each other, and, therefore, we may on this boat, as well as on other first-class steamers of 400 to 500 tons burden, take the expense for every mile of travel at \$2.00.

"The "Ambassador" carried in 1838, at an average, 100 cabin passengers, each of whom paid \$50.00 *per passage up*, and \$40.00 *per passage down* the river, and 100 to 150 deck passengers, who paid in part \$5.00, and in part \$8.00 each. Finally, she carried generally 200 tons of goods up, and 300 tons down. The receipts per trip of 1,450 miles were frequently \$7,500, while the expenses did not amount to more than \$2,900, leaving, therefore, a very considerable net profit. On her trips, in 1839, the "Ambassador" averaged only up to the month of June 65 cabin passengers per trip, but, nevertheless, the boat will again give a handsome profit.

"The steamboats "Franklin" and "Ambassador" belong, as I observed, to the most elegant, and charge, therefore, the highest rates. Boats of a cheaper construction, and less elegant, with their crew not so well paid, incur much less expenses: and we find boats of 200 or more tons, on which the expenses per mile of travel are only fifty cents. If, therefore, these boats only carry 34 passengers at an average, each paying one and one-half cents per mile, the expenses are already

covered. Should the number of passengers be less, or the expense of running greater, the charges for transportation must be increased.

"The greatest number of accidents happen upon the Mississippi and Ohio Rivers, where the steamboats continue their passage day and night, from New Orleans to Pittsburg. The length of this voyage is 2,000 miles, and, including the stoppages necessary for taking in wood and for landing and taking passengers on board, the trip is made in ten days up, and six or seven days down the river. In the first case, the engines are through 240 hours constantly at work, during which time the boilers are incessantly heated, though the same is still more the case with the engines in manufactories, and in the Atlantic steamships. It must be considered here that Pittsburg lies ten and one-half degrees further to the North than New Orleans, and it requires a good health to support the enormous difference in the temperature of the two cities. It becomes evident that the engineers superintending the engines cannot afford to give the same the required attention, and explosions must consequently become more numerous.

"Many accidents happen by "snags" and "sawyers," so called. They are trees torn away from the banks of the river, which get fast with their roots at some point, and remain in positions most dangerous to the steamboats. Whole islands are sometimes formed by such floating trees. For removing these obstructions, particular machines have been invented, and are constantly employed upon these rivers.

"The Americans are, as is known, the most enterprising people in the world, who justly say of themselves, "*We go always ahead.*" The Democrats here never like to remain behind one another: on the contrary, each wants to get ahead of the rest. When two steamboats happen to get alongside of each other, the passengers will encourage the captains to run a race, which the latter agree to. The boilers intended for a pressure of only 100 pounds per square inch, are by the accelerated generation of steam, exposed to a pressure of 150, and even 200 pounds, and this goes sometimes so far, that the trials end with an explosion. Seldom they have here, as they do in Europe, fixed in the boiler a plate of a composition which melts at a certain degree of heat, and the fire becomes extin-

guished by the water. The races are the causes of most of the explosions, and yet they are still constantly taking place. The life of an American is, indeed, only a constant *racing*, and why should he fear it so much on board the steamboats?

"In order not to lose too much time, wood is taken in only every twelve hours. The quantity they take is, for large boats, 30 cords, or 3,840 cubic feet. As generally hard wood is used, the additional load which the boat receives at once, and on its fore end amounts to about 1,800 cwts., and, in consequence thereof, the boat touches the bottom sometimes on the flat banks. The taking in of wood lasts one hour, during which the fire is constantly kept up and the steam attains a very high pressure, necessary sometimes to bring the boat afloat. At the same time, they often neglect to pump the necessary supply of water for the boilers, the iron in the flues becomes bare and red hot by the action of the flame, and when, at the starting, the water again fills the boiler, the steam is so suddenly generated that an explosion is the consequence. Although it is generally known that most explosions occur when the boat starts, after having got their supply of wood, the thoughtless travelers remain, notwithstanding, on the fore part of the boat, where they are most exposed.

"During the nights it sometimes happens that in the windings of the river two boats, going at a great speed, meet each other, and, by the concussion, the weaker boat instantly sinks.

"I have observed already that there are only two pilots upon each steamboat, who perform their service alternately every four hours, but remain on board for the whole voyage from New Orleans to Pittsburg, of 2,000 miles. It has never been the practice here to take new pilots from station to station, and the consequence is, that the pilots, not acquainted with such an extent of river, which at the same time is subject to so frequent changes, the vessels often run aground, and that then the engineer by using steam of too high a pressure exposes the boat to explosions.

"It is to be regretted that steam navigation was carried on in America five years before it was successfully tried in Europe. It would be still more to be regretted, if, at present, when in 20 years, with an expenditure of \$45,000,000, the

Americans have acquired such a mass of experience, and brought steam navigation to such a high degree of perfection, we were still to hesitate in Europe to adopt the American plan of construction. The steam navigation companies in Europe ought to compare the data given in this letter, with the rate of wages and other prices in Europe, calculate the prices of transportation of passengers and goods, compare the same with their actual prices, and they will see the advantage which would result to them by the adoption of the American system."

The use of the steam whistle, for the purpose of a signal on the steamboats of the western rivers, does not appear to have been prior to 1843, or 1844, and then on a few boats by the way of experiment, but it was not made compulsory by law until 1855. The previous practice for signalling was by the use of bells. The system here adopted was for the down-stream vessel, being generally loaded and the more unmanageable of the two, should have the right of way, or giving the first signal, which was one tap of the bell, if wishing to go to the right, or two taps if desiring to go to the left, and should continue tapping, at short intervals, until the up-stream boat answered it and steered as indicated by the signals. In 1850, Davis Embree, of the "Western Boatman," published at Nashville, Tenn., began an agitation for a change in this system, but he was met with a united and bitter opposition to any change from the western river steamboat owners. In 1852, Congress passed the Steamboat law, and Mr. Embree was appointed supervising inspector of the St. Louis district, and, while a member of the Board, was instrumental in having some changes made in the law. In the meantime the steam whistle had been applied very generally, and in 1854, the Board passed a rule that the steam whistle should be used in place of the bell for signalling purposes, although some thought at the time it was not reliable for the purpose. It met the opposition of the owners for some time. The rule made by the Board, in October, 1857, required for the "rivers flowing into the Gulf of Mexico, etc., that the pilot of the ascending boat to sound his steam whistle once, if he shall wish to keep his boat to the right, and it shall be the duty of the pilot of the descending boat to answer the same promptly by one sound of his steam whistle, and both

boats shall be steered according to such signal. Or, if pilot of ascending boat wished to keep his boat to the left, he shall sound his steam whistle twice, etc." This rule remained in force until 1872, when it was amended, giving the descending boat the right to alter the first signal if from darkness of night, narrowness of the channel, or any cause that rendered it necessary for the descending boat to take the other side. This change at first was the cause of many collisions, but it was continued in force until February, 1880, when the rule was again amended, providing that the descending boat should have the making of the first signal. In 1883 the law was again changed, so that it was as in 1872.

A western river pilot, of long service, thus gives his experience with tornadoes, and the dangers attending river navigation during sudden storms on the western rivers:

"On the southwestern rivers, the months of March and April are considered the most windy, and in these months the most notorious tornadoes, or hurricanes have occurred. These tornadoes, as we call them, seem to run in veins, as they open an avenue in a forest for miles in length, and not over a mile in width. Pilots are generally good judges of weather, and they are constantly on the lookout for squalls. The tornado will give him short notice where it is, by a slight breath of air, quick lightning and distant thunder. If in the night time, he will make for some soft place to lay his boat until the storm passes. The hard knocks the pilots get from these squalls very seldom last over ten minutes. The wind may continue to blow hard for hours, but the worst is generally over at the commencement, and the detention of the vessel at the shore is not necessarily long.

"In a practical experience of nearly 50 years, I have only fought these violent hurricanes four times, and in these battles I was not in the centre, but on the edge, having a chance to dodge the enemy.

"My first engagement occurred in March, 1830, coming up with the steamer "Patriot," a first-class boat. Behind the bar, opposite Brewinsburgh, daylight coming in sight and a squall coming on our starboard quarter, I put the helm aport to get away from the shore. The storm struck and in an instant all was dark. The boat careened to starboard, and my sliding

pilothouse 'kited' off with the wind. This brush—the worst of it—lasted about five minutes. As it cleared away, I found the "Patriot" head on to the soft bank (that I had put the helm down to wear away from), careened down, her starboard guard well under water. I soon backed out from the mud bank on an even keel, head up the river, with the loss of only my pilothouse top, and a detention of about twenty minutes.

"In the same month and on the same boat, bound down, at 3 o'clock a. m., at the foot of Wolf Island, a storm was in sight coming from the eastern shore. I had just time to round to and land on the foot of the island, Missouri side, safe as kittens; whilst trees were falling by hundreds within two hundred yards north of us. I think this storm was the most severe I ever experienced.

"The next storm was in March, 1832, going down the river on the staunch and fine steamer "Splendid," Capt. J. J. James, with the hull of the old "Red Rover" hitched alongside, both boats drawing nine feet. As the sun was going down, we were at the head of the Grand Chain, and it was four miles to a good landing at the foot of the rocks: hence there was no alternative but to fight the storm and rocks. The storm was fast coming toward us from the Illinois shore—we could hear it plainly. From where the wreck of the "Richmond" lay, I could see the Kentucky shore down to near the tall cottonwood tree—the old landmark—but before I got opposite to it, darkness, the storm, and rain closed in, and I had to guess all the rest. Capt. Shrieve had taken out most of the centre rock in this crossing, and part of the high left-hand rock, but all the rocks on the right were yet there. Guessing at it, keeping the wind on my starboard shoulder as long as I dared on account of the bar below, I quartered her to the wind and let her take her chances among the rocks. Our good engine beat ahead, apparently a long time. I could see nothing, nor feel any bumps from the bottom. It ceased blowing a little, and a voice sang out to me:

" 'Shall I make fast?'

" 'Where?' I asked.

" 'We are ashore, or the Red Rover is,' said the mate.

"The wind was so severe against us that we came into the bank under a full head of steam, without feeling it. Neither

officers nor men could stand on nor about the decks, without something strong to hold to. Capt. James and James Gorman laid flat on their bellies, holding on to the chimney-guy timber-heads, wet as drowned rats, until we were landed. At daylight next morning we found our landing was made immediately under the hanging cedar tree in the bluff. This was evidence that I did not miss the channel much.

"The last tornado that I encountered was in March, 1849. In charge of the fast steamer "Independence," and coming up the Mississippi, when about six miles above Bayou Sara, and as day was breaking, the pilot on watch, Isaac Smith, sent me word a storm was coming. I hastened to the hurricane deck, half clad, and saw it coming, quartering down from the east shore—the shore we were running near—but the overhanging trees prevented a good landing. It was getting light that we could see about us, and I judged that we could weather it under way. It soon hit us. My station was at the starboard forward chimney guy. The first puff broke the pilot house loose from its fastening, carrying it back about three feet, where the tiller ropes brought it up. The moving of the pilot house rang the engine bell, and the engine stopped, the boat sheering out in the river. Limbs were breaking from the trees, and one limb of good size struck the chimney guy I was holding to, slid down and struck me on the shoulder, breaking my hold from the guy, and tumbling me off the hurricane deck down forward. The back of my head and shoulder struck the forward boiler-deck railing, checking the fall a little, and I landed on the forecastle right side up. By this time the worst of the storm had passed, and by handling the coupling blocks and one water wheel at a time, the engineer soon had the vessel safely landed. I had remained with the engineer, helping, but, when landed, I felt faint, grew dizzy and dropped to the deck. The engineer, John Smart, one of the best men that ever turned a throttle valve, picked me up and carried me to my room. He was our boat doctor, as well as engineer. In my case his remedy was brandy, camphor and bleeding. We were not detained here over two hours, and I was out at getting under way, and passing jokes with the rest, though I had quite a bump swelled on the back of my head by colliding on the down trip with the boiler-deck rail."

An engineer on the western rivers, in giving a few facts on inland navigation in these days, says: "There is no social distinction on board a Mississippi steamboat. The officers, from the captain down to the strikers, who are the engineer apprentices, eat at the same table and enjoy the same attention, there being no distinction made in any form. If the engineer's apprentice be a gentleman, and so desires, he can dress as well, and receive the same courtesy as either commander, clerk, pilot, mate, engineer or any one else. While it is true there are men as chief engineers, who are known as pretty 'hard to run with,' the majority are not so. The reason seems obvious. If you ship on one of our boats, it is for no definite time; if you do not suit they can, and doubtless will, put you off at the first landing, and, on the other hand, if you do not like the boat and its management, you can get off wherever you choose.

"Our steamboats are of two kinds, side wheel and stern wheel; but as the side-wheel boat is the proper and legitimate school for the engineer, I will give it and its machinery the most minute description.

"Our boats are made to navigate shallow water, hence are all flat bottomed, being made more for lightness of draught than speed. Our engines are all poppet valve, worked by levers, hence the name 'lever engine.' The valves are of three kinds—single, relief, and balance.

"The single valve is, as its name implies, a single valve, which, receiving the full pressure of the steam, makes them hard to raise. The relief valve is a single valve with a small valve in the centre, there being sufficient play to enable the small valve to raise first, relieving the larger valve. The balance valve is two valves, one above the other, only in one case; in all the later make of valves, the smaller valve is on the bottom. The valve motion is operated by four levers, placed on the side pipes, parallel with the cylinder. These levers set end to end, two of them working the receiving and two the exhaust valves; the extreme outer ends of the levers resting on four columns at the two extremes of the side pipes. The rests upon which the columns are placed are known by engineers as the 'horns.' Our engines are horizontally set on wooden timbers, (by way of experiment a few boats have replaced the wooden cylinder timbers by boiler-iron ones), each wheel being

worked independently of the other. The engines set one on each side forward of the wheel. The valve motion is operated by two cams, a full stroke and a cut-off. The full stroke works on the rock-shaft arm, working the exhaust levers, the levers being raised by lifters. The receiving levers are worked by a short cam-rod, connected with, though separate from the rock-shaft arm. There are two rock shafts. Thus, the lifter under the exhaust levers is a sleeve through which the rock shaft that operates the receiving levers is worked. The rock shaft, upon which the arm is attached, is separate from the other, being connected by a link to the loose sleeve: thus, when the full stroke (which works the exhaust at all times) is on, the lifter of the receiving side can be moved by hand, by simply raising the 'short hook' or cam-rod. When the engineer has his engine in motion, and is desirous of throwing on the cut-off, he raises the short hook, and places the cut-off on in its place, the cut-off rod swinging idly when not shipped up. Our engines cut off only when going ahead. To back, the cut-off is taken off, short hook dropped in its place, and the engine is ready to reverse. Most cut-off cams are of the folding pattern, and can be adjusted in a few moments to cut off at any desired length. The boilers on the western rivers are flue boilers, placed horizontally, side by side, a little forward of the engines. They are also placed equi-distant from the keelsons. They are fed with water from an independent pump, known as the 'Doctor.' The 'Doctors' are all beam engines, with four pumps, two cold and two hot water. Over and resting upon the columns of the 'Doctor,' are two heaters, in which the water is heated by the exhaust from the engines before it is forced into the boilers. As the cold-water pumps are made larger than the hot, there is always a surplus of hot water, which is wasted into the 'shoe,' thereby partially heating the cold water before it is introduced into the heaters. The exhaust steam, after it leaves the heaters, can be carried through the chimneys, or through the pipes on the roof at the will of the engineer. When carried through the chimneys it aids the draught. The boilers of a river steamer are connected one with the other in three different places, i. e., the steam drums, that run across the top of them; the mud drums, that hold a like position across the bottom, and, lastly, the connecting (or

check) joints that connect them under the tile. The latter connection is not universal, though very nearly so. There is no general rule for the steam drums, some boats having only one, while others have two. On a side-wheel boat, there are two steam pipes leading direct from the steam drum, one to each engine. The common mode of introducing water to the boilers is through the after-drum, which is attached directly under and to the after end of the boilers, the forward drum being directly aft of the furnace. The 'Snowden' heater is used to quite an extent, which consists of a check valve on the top of one of the boilers, and a pipe leading into the boiler to a point near the forward end, then returning aft and discharging the water into the after-drum. The water, when thus subjected to the effect of the steam, becomes very hot before it is introduced to the drum. From 190 to 210 degrees of heat is a pretty accurate average for the heating of the water, upon which steam boilers are fed. There is no definite rule for the use of the blow-off valve given, as every tributary of the Mississippi has water of somewhat different chemical composition, and the use of the blow-off is differently regulated. The Missouri and lower Mississippi rivers are, of all the rivers, the worst for mud, and, of course, the boilers are blown out often, some five or six, or even more times a day. In the upper Mississippi the water is clear, and I have run five days without raising the mud valve once. We blow our boilers out from both mud drums, and on most boats, with more than two boilers, there are four mud valves, one on each end of the two drums. The same rule holds good in cleaning out boilers. On the lower Mississippi and Missouri Rivers they clean out often, say every eight or ten days, while on the upper Mississippi they are not so careful. I have run about 38 days on the upper Mississippi without cleaning, and that, too, without any serious results. In fact, I am led to think it by far safer to run without cleaning than to clean out hurriedly while your boilers are yet hot.

"As the side-wheel boat is the only proper school for the river engineer, I have given a more perfect picture of her working than will be necessary for a stern-wheel boat. The engines for a stern-wheel boat are of the same form as for a side-wheeler, only both engines are attached to the one shaft, with cranks at right angles, and, when placed in the boat, are just

the opposite to what they would be on a side-wheeler, as the working platforms of a side-wheeler are on the outboard side of the engines, while on the stern-wheel boat, they are inboard, or between the two engines.

"There is no difference in boilers on the two classes of boats. The distance from engines to boilers is greatly increased on the stern-wheeler. A stern-wheeler draws her steam through a main pipe to the throttle valve, which sets in the centre between the engines, and from there is conveyed to the cylinders through two branch pipes.

"There are phrases found in the nomenclature of mechanical science that are obsolete in river engineering; that is, no river engineer ever approximates steamboat power by the term "horse power"; nor does he inform you of the working capacity of an engine by giving you the number of revolutions she makes a minute. The former is not used, because it would be next to impossible to average the revolutions of a boat. Particularly is this the case on all our western and southern rivers, except the lower part of the lower Mississippi. A side-wheel boat will increase her revolutions on extreme shallow water, so greatly sometimes that the engineer is compelled to shut them down. When an engine is guilty of this freak, it is termed "running off." A stern-wheel boat takes an opposite turn. I have left St. Louis on a stern-wheel towboat, flying light, drawing 40 inches of water, carrying 150 pounds of steam, and, in the deep water, to the mouth of the Red River, the engines turned 24 times a minute. With the same steam on in shallow water (there was six feet in the channel), the speed was reduced to 14 revolutions, and run for miles in that way. Striking a deep bend, her speed would run up, slowing down, however, the instant she struck a shoal place.

"Ask a river engineer regarding a boat's power, and he will tell you the size of her engines and the number of her boilers, and the number of flues in each boiler. The first boat I was ever on had three boilers and 20-inch cylinders. Did I wish to tell a river man about her, and wished to give him an idea of her size, I could do it no better than by saying, that 'she was a three-boiler boat,' and he would at once conclude the size of the boat, and really would not miss it far. Our boats are mostly owned by companies, yet, as a rule, the cap-

tain hires his own engineer. To have a chief engineer for a line is not common; in fact, I know of but one line of boats that support such a dignitary. When a boat starts out, one striker is put on watch with the 'boss,' and one with the second. A striker carries the water and does all the oiling, and helps to keep the machinery clean. In port they take hold, if they know how, and do what there is to be done the same as the engineer. Boiler cleaners are employed to clean the boilers when in port, and are generally under the control of the second engineer, though not always. All repairs are ordered by the first engineer.

"Stern-wheel boats carry only two engineers, there being no striker, the two engines being handled from the centre. In many cases both engines can be reversed at one time by the lever. If this is not the case, the engineer runs across the deck and changes the rods, having a fireman to assist him in a close place. Once in a while you will find an engineer that never run as a striker, but rose from some other way, but the 'boys' rather look upon him as an usurper, and only a 'stern-wheel engineer,' in no way 'a thoroughbred.' All steamboats have blacksmith shops, and the boys pride themselves on their ability to 'pound iron.' When it comes time for a boat to go out, the captain rings the bell, and when the engineer is ready he sounds the alarm whistle. Should the boat desire to land, the engineer is at once notified. As soon as the boat is landed, and there is no further use for the engineer, he is again notified by a sound of the alarm whistle. From then until the engineer sounds the ready whistle, he has the engines absolutely under his control, and no captain would think of cutting the boat loose, or ordering the wheel turned, without the engineer sanctioned it. Should a boat run into the bank and not sound her whistle 'done with the engines,' the engineer would always hold himself ready, unless he desired the engines to do some work, for then he, in turn, informs the pilot.

"On many towboats, where the engineers work steam slow, and they are carrying her 'hot,' if the pilot sees a place ahead where he wishes to work slow, he will inform the engineer in time to regulate his fires, also informing him when the bad place is over. And thus the whole system works in harmony."

Before railroads parallel with rivers were constructed,

there was more disposition to improve the speed of boats propelled by steam, because speed was an object to be obtained; but owners, since then, build vessels more with a view to business capacity than speed.

"Back in the thirties" is often referred to by old boatmen as the period when steamboat races, either with each other or against time, were most exciting. There being no parallel lines of railroad, passengers depended on steamboats for rapid transit, and the boat that could make the quickest time in her particular trade was the most popular with the traveling public. Racing on the rivers then was a common occurrence.

The quickest time ever made from New Orleans to Cincinnati was 5 days and 18 hours, in 1843, by the "Duke of Orleans." "The Diana" made a quick trip two years later, but outside of that one instance no effort to make fast time was made by any steamboat till the "Charles Morgan," in June, 1877, left New Orleans 24 hours later than the Robert Mitchell, passed the latter at Hawesville, and made the time to Cincinnati in 6 days and 11 hours, having made 42 way landings and lost three and a half hours getting through the canal at Louisville. In April, of the same year, the "Thompson Dean" made the run in 6 days and 19 hours, and had lost 14 hours in the canal and 17 hours at way landings. The "R. R. Springer," in 1881, came through from New Orleans to Cincinnati in 5 days, 12 hours and 45 minutes' running time, which was the quickest made since the trip of the "Duke of Orleans." Her best time was made while in the Mississippi River. From the time she reached the mouth of the Ohio, until she arrived at Cincinnati, her speed decreased. She consumed 22 hours and 5 minutes more time from New Orleans to Cairo, than did the "R. E. Lee," in 1870. In March, 1881, the "Will S. Hays" made the run in 6 days, 17 hours and 10 minutes, from port to port, having made 51 landings and met with several unusual detentions.

X To illustrate that speed has been steadily increasing where speed was an object, it may be mentioned that in 1817 the "Enterprise" made the trip from New Orleans to Louisville in 25 days, 2 hours and 4 minutes, and the "Washington" in 25 days. Two years later, the "Shelby" made it in 20 days, 4 hours and 20 minutes. In 1828, the "Paragon" in 18 days and 10 hours. Within the next five or six years the advancement

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in speed was more rapid, as the "Tecumseh," in 1834, was only 8 days and 4 hours from port to port. Three years later, the "Sultana" made the run in 6 days and 15 hours, and the "Express" in 6 days and 15 hours. X

In 1842, the "Ed Shippen" was claimed to have covered the distance in 5 days and 14 hours, which time was not beaten till 1849, when the "Sultana" cut it down to 5 days and 12 hours, and this was again cut down by the "Bostona," in 1851, to 5 days and 8 hours, and further reduced by the "Belle Key," the next year, to 4 days and 20 hours, and by the "Reindeer," in 1853, to 4 days, 19 hours and 45 minutes, the "Eclipse" to 4 days, 9 hours and 31 minutes, and the "A. L. Shotwell" to 4 days, 9 hours and 19 minutes. In 1832, the steamer "Diana" received from the Postoffice Department of the United States a prize of \$500 in gold, which had been offered to the first boat that would make the run from New Orleans to Louisville inside of 6 days. Her time was 5 days, 23 hours and 15 minutes.

Steamboat racing did not end with the decade of the thirties. On the contrary, many exciting races have since been engaged in when the boats happened to leave a given port at one time and were pointed in the same direction.

Among the races of former years, there were none more exciting than that between the "Baltic" and "Diana," from New Orleans, some time in the fifties—perhaps about 1854. During that period a number of handsome steamers were engaged in the trade from Louisville to New Orleans, which would generally go into the latter city fully laden, take enough freight for ballast, and all the passengers that wanted to come, and hurry back to Louisville for another cargo. They kept out of the way of each other as much as possible, by leaving Louisville on different days, but sometimes it would happen that two would leave New Orleans on the same day. The "Baltic" and "Diana" left New Orleans together, the "Baltic" slightly in the lead. Neither of the boats had ever exhibited remarkable speed, and while this was what might be called a slow race, it was the longest race that ever was contested, and very exciting to the passengers and crews on both. The distance is 1,480 miles, and there was not an hour of the time occupied by the trip that the two boats were not in sight or hearing of each other. An artist, who was on board the "Baltic" at the

time as a passenger, immortalized the event by transferring to canvas, in oil, a night scene, in which were depicted the two imposing steamers in the foreground. Chromo imitations of the picture were afterward made, and met a rapid and profitable sale. The "Baltic" won the race, more by reason of mismanagement on the "Diana" than because she was the faster of the two.

The speed gained by steamboats as the years rolled by, it may be noted that, in 1844, the quickest recorded trip from New Orleans to Cairo was made by the "J. M. White," in 3 days, 6 hours and 44 minutes; in 1852, by the "Reindeer," in 3 days, 12 hours and 45 minutes; in 1853, by the "Eclipse," in 3 days, 4 hours and 4 minutes, and by the "A. L. Shotwell" in 3 days, 3 hours and 40 minutes. This time was not shortened till 1870, when the "R. E. Lee" (her second run) "set the pegs" at 3 days, 1 hour and 1 minute, which remains the quickest time to this day. The distance is 1,040 miles.

In May, 1882, four quick trips were made from Helena to Memphis. The first was made by the "Belle Memphis," in 5 hours and 53 minutes; the second by the "City of Cairo," in 5 hours and 52 minutes; the third, by the "City of Providence," in 5 hours and 49½ minutes, and the last by the "James Lee," in 5 hours and 14 minutes. In March, of the next year, the "Kate Adams" made the run in 5 hours and 18½ minutes.

Cut-offs in the stretch of river between Helena and Memphis had reduced the distance about 15 miles since the "Lee"-*"Natchez"* race. The time of the "Lee" was 6 hours and 43 minutes, and this had been beaten May, 1853, by the "Eclipse," which made the run in 6 hours and 17 minutes, and by the "Peytona" several years before, in 6 hours and 36 minutes. The distance has been shortened by cut-offs and changes of channel about 30 miles between the time the "Peytona" ran, and the time that the four boats first named ran, when the distance was not more than 90 miles. Cut-offs are no advantage to an ascending steamer, as they create a strong current.

X From New Orleans to Natchez—distance, 273 miles—the quickest time made, in 1814, was 5 days and 10 hours, by the "Comet"; in 1815, the "Enterprise" occupied 4 days, 11 hours and 20 minutes in making the same trip, and this was cut down two years later—3 days and 20 hours, by the "Shelby." Two

years later still, the "Paragon" made it in 12 hours less time, and set the pegs for the next 9 years, when, in 1828, the "Tecumseh" consumed only 3 days, 1 hour and 20 minutes. This time was first beaten in 1834, when the "Tuscarora" made the trip in 1 day and 21 hours, and it was cut down four years later by the "Natchez," to 1 day and 17 hours. In 1840, the "Edward Shippen" reduced the time to 1 day and 8 hours. In 1844, days were no longer of use in stating the time necessary for the trip, as the "Sultana" made it in 19 hours and 45 minutes, which was not beaten till 1853, when the new "Natchez" shortened it to 17 hours and 30 minutes. The "Princess" made the same time in 1856. In their great race from New Orleans to St. Louis, in 1870, the "Natchez" and "Robert E. Lee" both set the pegs at 17 hours and 11 minutes.

No steamboat race ever excited so much interest throughout the civilized world as that which took place between the "Robert E. Lee" and "Natchez" in June, 1870, from New Orleans to St. Louis. On the 24th of that month the "Natchez" had arrived at St. Louis, having overcome the distance from New Orleans, 1,218 miles, in 3 days, 21 hours and 58 minutes. From the time that she was built, at Cincinnati, much rivalry in regard to speed had been exhibited between her and the "Robert E. Lee," which was built at New Albany during the war, and was towed across the river to the Kentucky side to have her name painted on her wheel-houses, a measure of safety that was deemed prudent at that exciting time. Both boats had their friends and admirers, as did the captains of both. Capt. John W. Cannon commanded the "Lee," and Capt. Thomas P. Leathers, owner of the "Natchez" and her half-dozen or more predecessors of the same name, commanded the "Natchez" of that time. Both were experienced steamboatmen, but as the sequel proved, Captain Cannon was the better strategist. While both boats had their friends, the name of the "Robert E. Lee" was most honored and most popular along the Mississippi River.

Before the return of the "Natchez" to New Orleans, Captain Cannon had determined that the "Lee" should beat the record of her rival, the fastest that had ever been made over the course. He stripped the "Lee" for the race, removed all parts of her upper works that were calculated to catch the

wind; removed all rigging and outfit, that could be dispensed with, to lighten her, as the river was low in some places; engaged the steamer "Frank Pargoud" to precede her a 100 miles up the river, to supply coal; arranged with coal yards to have fuel flats awaiting her, in the middle of the river, at given points, to be taken in tow under way, until the coal could be transferred to the deck of the "Lee," and then to be cut loose and float back. He refused all business of every kind, and would receive no passengers.

The "Natchez" returned to New Orleans and received a few hundred tons of freight, and also a few passengers, and was advertised to leave again for St. Louis, June 30th. At 4.45 o'clock in the afternoon, the "Robert E. Lee" backed out from the levee, and five minutes later the "Natchez" followed her, but without such elaborate preparation for a race as had been made on the "Lee," Captain Leathers feeling confident that he could pass the latter within the first hundred miles.

A steamer had preceded the racing boats up the river many miles, to witness all that could be seen of the great race that was to be. The telegraph informed the people, along both banks of the river, and the world-at-large, of the coming great struggle for supremacy in point of speed, and the world looked on with as much interest as it would had it been an event local to every part of it. Wherever there was human habitation, the people collected on the bank of the mighty river to observe the passage of the two steamers. The "Lee" gained slightly every 100 miles, as the race progressed, which gain, at Natchez, 300 miles from the starting point, amounted to 10 minutes, attributable more to landings that had been made by the "Natchez" for fuel, than anything else. The people of the whole city of Natchez viewed the race. At the bend, at Vicksburg, although the two steamers were 10 miles apart by the course of the river, the smoke of each was plainly discernible from the other. Thousands of people were congregated on the bluffs. At Helena, and other points, it seemed that the population, for miles back from the river, had turned out to witness the greatest race of this or any other age.

At Memphis, 10,000 people looked at the passing steamers, neither of which landed, the "Natchez," by this time, having adopted the "Lee's" method of receiving fuel. At every point

where there was a telegraph instrument, the hour and the minute of the passing steamers were ticked to all points of America that could be reached, and newspapers throughout the country displayed bulletins, denoting the progress of the boats.

The time of passing Memphis, Vicksburg, and Cairo was cabled to Europe. When Cairo was reached the race was virtually ended, but the "Lee" proceeded to St. Louis, arriving there in 3 days, 18 hours and 30 minutes, from the time she left New Orleans, beating by 3 hours and 28 minutes the previous time of the "Natchez." The latter steamer had grounded, and run into a fog between Memphis and Cairo, which delayed her more than 6 hours.

When the "Lee" arrived at St. Louis, 30,000 people crowded the wharf, the windows and the housetops to receive her. No similar event had ever created so much excitement. Captain Cannon was tendered a banquet by the business men of the city, and was generally lionized while he remained there. It was estimated that more than \$1,000,000 had been wagered on the race by the friends of the two steamers. Many of the bets were drawn, on the ground that the "Lee" had been assisted the first 100 miles by the power of the "Frank Pargoud" added to her own; and men of the coolest judgment have ever since regarded the "Natchez" as the faster boat, but out-generated by the commander of the other.

TIME OF THE "R. E. LEE," FROM NEW ORLEANS TO ST. LOUIS,
MO., IN JULY, 1870.

Left the wharf at New Orleans, June 30, 1870, at 4.55 P. M.,
and reached the wharf boat at St. Louis, July 4, at 11.25 A. M.

		Days.	Hours.	Min.
Time to Baton Rouge	—		8	25
" " Natchez, 273 miles	—		17	11
" " Vicksburg, 393 "	1		0	38
" " Memphis, 800 "	2		6	—
" " Cairo, 1,040 "	3		1	—
" " St. Louis, 1,218 "	3		18	30

While there are now many large, fine passenger steamboats on the western rivers, still their numbers are much less than thirty years ago; the extension of the railroads in that time in the West, and the low comparative cost of freight car-

riage by that means, have made it a poor investment to subscribe toward the building of a line of passenger boats on the rivers of late years. Providing the government were to take more interest in the future to improve the navigation of the Ohio and the Mississippi Rivers, by generous appropriations, there is no doubt but that a great deal of the natural products of the Middle West and Mississippi Valley, that now find their way by rail to the Atlantic Coast, would be forwarded by the river route to New Orleans, and there find its way to foreign countries by steamers sailing from the latter port. The better the condition of navigation on the rivers, the lower the rates of insurance on floating property, which is something of an item of expense.

There were a few steamboats in the early days on the western rivers that had what we would now call a collision bulkhead. In all probability, not so well designed, nor constructed, and being built of wood not always tight. We find that in 1820 the "Columbus" was "perforated by a snag, and only saved from sinking by having a snag room, which apartment only was filled with water." In 1824, the "Caledonia," running on the Mississippi River, also had a snag room.

They also had some of the present modern improvements in the shape of compound engines, in 1844, on the western rivers, then denominated "Clipper" engines, from the name of the first steamboat to which they were fitted. There were six steamboats in all having this type of engine on the western rivers. The "Clipper" had a pair of engines, each engine having cylinders of 16 inches and 32 inches by 8 feet stroke. There was no further building of compound engines until Andrew Hartupée, of Pittsburg, constructed those for the "Dictator," of 1,500 tons, in 1865, for the St. Louis & N. O. trade. The "Quickstep," of 500 tons, in 1866, for Ohio River, came next, with the "Great République," for the Mississippi River, in 1867. These were followed, in 1870, by compound engines, in the large towboat "John A. Woods," and in 1876, in a much larger towboat, the "Jos. B. Williams." There were several smaller vessels with Hartupée's compound engines, built at a later date. Within a few years there have been a few built for the upper Mississippi River business.

As to iron-hull steamboats on the western rivers, the first

built in the United States was named "United States," constructed by the West Point Foundry, at New York, in 1838, for service on Lake Pontchartrain and canal at New Orleans, La. This was a double-hull boat, 110x26x3.6, with a paddle wheel in the space between the hulls. The first *single iron hull* built in the United States was the "Valley Forge," built by Robinson & Minis, steam-engine builders, at Pittsburg, Pa., and completed in December, 1839. The next year, the material for an iron hull, built in England, was received and re-erected at Jeffersonville, Ind., and the vessel named "W. W. Fry." In November, 1840, the vessel left Louisville for Mobile, Ala., where she did service until worn out, about 1860. It may be said, in passing on this subject, that there were four iron hulls constructed by the same builder as the "W. W. Fry"—John Laird, of Birkenhead—for the Savannah River, between 1834 and 1838, and the vessels used as passenger and towboats. They were about 120 feet long.

Nothing further was done in this line, excepting the naval steamer "Alleghany," in 1847, and three revenue steamers, about the same time, with the iron-clad monitors during the Civil War, until 1870, when the "Clyde" was built by the Iowa Iron Works at Dubuque, Iowa, and, in 1871, the stern-wheeler "John T. Moore" was constructed at Cincinnati, Ohio, and, in 1874, the Western Iron Boat Building Co., at Carondelet, Mo., built the snag-boat "O. G. Wagner." This company built about twelve more vessels, some of large size, before going out of business in 1883. There are at the present time four or five yards on the western rivers where iron-hull vessels are constructed, two of the yards having started at New Orleans, La., in 1899, where there is considerable repair work on the ocean freighters running to that port.

Wire tiller rope was made at Pittsburg, Pa., as an experiment as early as 1839, for use on the western river boats. So many vessels had been burned, and during the early stages of a fire on board a vessel the Manila rope was about the first thing to go, that they sought a body for the rope that was not so easily consumed.

The deepest mouth of the Mississippi River, prior to 1840, was the Northeast pass, that had 12 feet of water, but at a later date shoaled up, and the Southwest pass was found to

answer for the size of vessels calling at New Orleans, the steam vessels being mainly those running to Texas ports and to Mobile, being not over 600 tons. After 1849, when the California trade opened and steamers running from New York to the Isthmus of Panama called at New Orleans, an increased depth of water was required on account of the larger size of the vessels employed. Measures were then taken to deepen the channel, as many vessels grounded on the bar, and in some cases were compelled to lighten their cargo to get safely over the shoals. In 1852, there was observed in the channel, on the bar, at the mouth of the Southwest pass, the least depth of 13 feet, at the time of lowest water; in the South pass a depth of 6 feet, at the Northeast pass a depth of 10 feet, and at the pass A'loutré, 13 feet. In 1853, dredging was resorted to, and 18 feet of water obtained at Southwest pass. In three years the channel had filled up again, when a contract was made for opening Southwest pass and pass A'loutré, with a channel depth of 20 feet, but for two or three years a depth of 18 feet could only be maintained. The war then came on and the passes were neglected for more important business.

In 1867, an appropriation was made by Congress for the improvement of the mouth of the river, and the engineers' bureau of the War Department assumed charge of the work. A steam-propeller dredge was constructed by the Atlantic Works, of East Boston, Mass., in that year, and named "Es-sayons." This vessel was 160'x30'x20', and was fitted with engines placed in opposite ends of the vessel, and operated separate and distinct from one another. The forward propeller was six-bladed and 14 feet diameter, and used for stirring up the deposit of the bottom. There was a mud keel on this end of the vessel, extending lengthwise about 6 feet, and 3 feet below the keel proper. The after-propeller was 12 feet in diameter, and employed in the propulsion of the vessel. The draft of water was regulated by water-tanks. There was a second steam-propeller dredge built by John Roach & Son, in 1872, with slightly larger hull, and named "Genl. M. D. McAlester." In 1868 the bar on Southwest pass had a least depth of 13 feet, and on pass A'loutré 11 feet. The largest of the coastwise steamships, side-wheel and propeller, running

to New Orleans at this time, had a loaded draft of from 14 to 18 feet. These large propellers, to cross the bar, resorted to the scheme of dredging the channel for their passage, by backing in, stirring up the mud and working themselves across the bar. This was the principle of the steam dredge. When there was a fleet trying to get over at the same time, there was often a great delay, for some vessel would get aground and delay those following sometimes a day or more. The side wheelers had to plough their way through. It was expected with these dredge boats to obtain and maintain a depth of 20 feet over the bar, but after four years' work it was found impossible to obtain more than 19 feet at the maximum, and at times shoaling down to 17 feet. In 1873 it was reported that "the work is not susceptible of permanent completion." It was at this time that larger steamships were building for the old lines running coastwise to New Orleans, and two new foreign lines were ready to enter the foreign trade at the same time. These latter had been attracted by the growing importance of New Orleans as a point for the export of grain in bulk, in consequence of the cheapness and facility with which grain in bulk could be delivered in model barges from points on the Mississippi River and its tributaries.

Congress now recognized its responsibility in the matter, and in 1874 invited plans for the improvement of the mouth of the river. A ship canal from Fort St. Philip to the Gulf, and the building of jetties at the mouth of the river were recommended. This latter project was strongly advocated by James B. Eads, who had solved several difficult engineering problems in the West at that period. There was considerable friction between the advocates of the rival systems that was carried into the halls of legislation, and it resulted, after being referred to a committee composed of three army engineers, three engineers from civil life, and one from the United States Coast Survey, as to the proper method of opening the mouth of the river, in favor of the jetty plan, to be applied to the South pass. Capt. James B. Eads made a contract to obtain a channel 20 feet deep in thirty months from March 3, 1875, and having obtained such a channel, he was to receive \$500,000 for every two feet in depth until a depth of 30 feet was obtained. He was to receive \$500,000, with additional pay-

ments for maintaining the channel. There was also a provision in the contract which gave Capt. Eads \$100,000 a year for twenty years, for maintaining and keeping the jetty works in repair. The method adopted in constructing these jetties was in the use of willow mattresses laid in layers and weighted with stone, and on this foundation a concrete wall was built. The east jetty, as constructed, is $2\frac{1}{3}$ miles long, and the west jetty is $1\frac{1}{2}$ miles. They were completed in July, 1879, and the depth of water at the South pass that was in 1875 on the bar but 14 feet had been increased at the time of the completion of the jetties, to from 27 to 30 feet, with a navigable channel from the head of the passes of 26 feet and a width of 165 feet. The cost of the construction of these jetties to the government has been near to \$6,000,000. According to the latest survey, there is in the channel, between the jetties and the head of the passes, a depth of water ranging from 28 feet to 33 feet. Dredging has to be resorted to at times, for the mud banks keep forming through some subterranean agency, and shoaling up the channel.

DIMENSIONS OF SOME OF THE PROMINENT WESTERN-RIVER STEAMBOATS RUNNING IN 1850.

"Clipper No. 2."—Hull, 215'x32'x6'9"; water wheels, 25'x11'4"; boilers, 4 of 26'x36"; engines, 2 of compound type, with 16" and 32" cylinders by 8 feet stroke to each engine; shaft, 12" diameter; steam pressure, 150 lbs.

"Brilliant."—Hull, 227'x32'x7'6"; water wheels, 29'6x11'4"; boilers, 5 of 26 $\frac{1}{2}$ 'x40"; engines, 2 of 26"x8'; steam pressure, 140 lbs.

"Keystone State."—Hull, 250'x30'x7'6"; water wheels, 30'x12'; boilers, 4 of 30'x42", with 18" flues; engines, 2 of 25 $\frac{1}{2}$ "x8'; steam pressure, 140 lbs.

"Buckeye State."—Hull, 264'x30'x7'10"; water wheels, 31'x11'6"; boilers, 5 of 30'x42", with 18" flues; engines, 2 of 29"x8'; steam pressure, 140 lbs.

"Messenger No. 2."—Hull, 244'x31'x7'3"; water wheels, 30'x12'; boilers, 5 of 30'x40", with 16" flues; engines, 2 of 28"x7'6"; steam pressure, 150 lbs.

"Cincinnati."—Hull, 242'x31'x7'4"; water wheels, 32'6x11'; engines, 2 of 24"x7'; boilers, 4 of 28'x40".

"Hibernia No. 2."—Hull, 226'x28'x7'; engines, 2 of 28"x8'; boilers, 5 of 27'x40"; water wheels, 26'x12'.

"Ben Franklin."—Hull, 255'x34'x7'; engines, 2 of 30"x8'; boilers, 6 of 32'x40"; water wheels, 27½'x14'7.

"Bostona."—Hull, 265'x34'x7'6; engines, 2 of 27"x9'; boilers, 5 of 34'x42"; water wheels, 30'x14'.

"Alex. Scott."—Hull, 266'x34'x8'; engines, 2 of 25"x10'; boilers, 6 of 31'x42"; water wheels, 30'x15'.

"Peytona."—Hull, 265'x33'x8'; engines, 2 of 30"x10'; boilers, 6 of 32'6"x42"; water wheels, 30'x16'.

"Magnolia."—Hull, 295'x35'x9'; engines, 2 of 30"x10'; boilers, 6 of 30'x42"; water wheels, 40'x12'.

RUNNING AFTER 1850.

"Arkansas City," 1882.—Hull, 275'x44'x8'; engines, 2 of 26"x9'; boilers, 5 of 30'x44"; water wheels, 34'x14'6.

"Annie P. Silver," 1878.—Hull, 300'x40'x9'.

"A. L. Shotwell," 1852.—Hull, 310'x36'x8'; engines, 2 of 30"x10'; boilers, 6 of 32'x42"; water wheels, 37'x15'.

"A. C. Donnelly," 1876.—Hull, 283'x41'x7'4; engines, 2 of 22"x7'.

"Bostona," 1879.—Hull, 302'6"x42'x6'; engines, 2 of 25"x8'; boilers, 4 of 30'x47"; water wheels, 27'x16'.

"Belle Lee," 1868.—Hull, 300'x43'x9'6; engines, 2 of 34½"x9'; boilers, 8 of 30'x40".

"Bismarck," 1867.—Hull, 287'x45'6"x9'; engines, 2 of 26½"x9'; boilers, 5 of 26'x40".

"Belle Memphis," 1866.—Hull, 275'x42'6"x8'4; engines, 2 of 27"x8'; boilers, 5 of 28'x44"; water wheels, 34'x14'6.

"Belle of Shreveport," 1872.—Hull, 250'x43'x6'9; engines, 2 of 22"x7'; boilers, 4 of 24'x38".

"Charles Morgan," 1874.—Hull, 302'x43'x7'6; engines, 2 of 28"x8'.

"Charles P. Chouteau," 1876.—Hull, 300'x56'x7'8; engines, 2 of 22"x8'; boilers, 4 of 32'x42".

"Centennial," 1876.—Hull, 300'x41'x7'8; engines, 2 of 26"x7'; boilers, 4 of 32'x42".

"City of Greenville," 1879.—Hull, 275'x45'4"x9'; engines, 2 of 26"x10'; boilers, 5 of 32'x42".

"City of Providence," 1880.—Hull, 283'x44'x8'6; engines, 2 of 26"x9'; boilers, 5 of 30'x44"; water wheels, 34'x14'6.

"City of Alton," 1873.—Hull, 280'x50'x9'; engines, 2 of 30"x9'; boilers, 5 of 28'x44".

"City of Vicksburg," 1870.—Hull, 280'x44'x8'6; engines, 2 of 26"x9'; boilers, 5 of 30'x44".

"City of Cairo," 1864.—Hull, 272'x44'x7'6; engines, 2 of 26"x9'; boilers, 5 of 30'x44"; water wheels, 35'x15'.

"City of Quincy," 1870.—Hull, 275'x47'x6'8; engines, 2 of 28"x10'; boilers, 5 of 26'x41".

"City of New Orleans," 1881.—Hull, 300'x49'6x9'6; draft, 3'7; engines, 2 of 26"x10'; boilers, 5 of 30'x44"; water wheels, 35'x15'.

"City of Baton Rouge," 1881.—Hull, 300'x49'6x9'6; draft, 3'7; engines, 2 of 26"x10'; boilers, 5 of 30'x44"; water wheels, 35'x15'.

"City of St. Louis," 1883.—Hull, 310'x49'6x9'6; draft, 3'7; engines, 2 of 26"x10'; boilers, 5 of 30'x44"; water wheels, 35'x15'.

"Charles Bodman," 1870.—Hull, 276'x46'6x7'6; engines, 2 of 26"x9'.

"Commonwealth," 1864.—Hull, 260'x43'x8'8; engines, 2 of 22"x9'; boilers, 6 of 28'x37".

"Cherokee," 1873.—Hull, 211'x39'x6'; engines, 2 of 16"x5'.

"Dacotah," 1879.—Hull, 250'x48'8x5'6; engines, 2 of 18"x7'.

"Eclipse," 1852.—Hull, 363'x36'x9'; engines, 2 of 36"x11'; boilers, 8 of 32'6x42"; water wheels, 41'x14'.

"Ed. Richardson," 1879.—Hull, 310'x50'x10'6; engines, 2 of 38"x10'; boilers, 9 of 32'x42"; water wheels, 41'x—.

"Ed. J. Gay," 1859.—Hull, 250'x40'6x8'3; engines, 2 of 27"x8'; boilers, 6 of 32'x42".

"Exporter," 1872.—Hull, 210'x48'x8'; engines, 2 of 22"x8'; boilers, 4 of 30'x40".

"Fleetwood," 1866.—Hull, 303'6x44'x7'; engines, 2 of 25"x8'.

"Fleetwood," 1880.—Hull, 303'x44'x7'; engines, 2 of 25"x8'6.

"Fred A. Blanks," 1879.—Hull, 260'x41'x9'6; engines, 2 of 26"x9'; boilers, 6 of 30'x42"; water wheels, 32'6x14'6.

"Frank Pargoud," 1868.—Hull, 250'x41'x9'4; engines, 2 of 32"x9'; boilers, 7 of 28'x38"; water wheels, 36'x15'6.

"Great Republic," 1867.—Hull, 328'x51'x10'; 2 engines of compound type, with cylinders of 28" and 56" diameter by 10' stroke to each engine.

"Grand Republic," 1876.—Hull, 350'x56'8x10'6; draft, 4'6; engines, 2 of compound type, with cylinders of 28" and 56" diameter by 10' stroke to each engine; boilers, 7 of 28'x42"; water wheels, 38'6x18'; engines from "Great Republic."

"Guiding Star," 1878.—Hull, 302'x40'4x7'6; engines, 2 of 26"x7'6.

"Gem City," 1881.—Hull, 300'x46'x6'; engines, 2 of 28"x7'; boilers, 4 of 28'x44".

"Glencoe," 1871.—Hull, 293'x44'x7'4; engines, 2 of 24"x8'; boilers, 6 of 26'x37".

"Golden City," 1876.—Hull, 280'x40'6x6'4; stern wheeler; engines, 2 of 22"x8'; boilers, 4 of 28'x47"; wheel, 25'x29'.

"Golden Crown," 1877.—Hull, 261'6x41'x6'6; engines, 2 of 19"x7'.

"Golden Rule," 1877.—Hull, 261'x41'x6'6; engines, 2 of 22"x7'.

"General Quitman," 1859.—Hull, 260'x40'x8'6; engines, 2 of 30"x10'; boilers, 7 of 30'x40".

"Gold Dust," 1874.—Hull, 250'x40'x7'6; engines, 2 of 22"x7'; boilers, 4 of 32'x42".

"Governor Allen," 1867.—Hull, 218'x41'x10'; engines, 2 of 27"x8'; boilers, 6 of 28'x38".

"Henry Frank," 1878.—Hull, 276'x52'x10'6; engines, 2 of 24"x9'; boilers, 6 of 28'x42".

"Indiana," 1865.—Hull, 263'x40'6x7'3; engines, 2 of 25"x8'; boilers, 5 of 26'x40".

"Iron Queen," 1892.—Hull, 237'6x37'8x6'; engines, 2 of 18"x7'; boilers, 4 of 28'x42".

"John W. Cannon," 1878.—Hull, 262'6x43'x9'6; engines, 2 of 34"x9'; boilers, 7 of 34'x42"; water wheels, 37'6x16'.

"John K. Speed," 1892.—Hull, 261'x42'x8'; engines, 2 of 22"x8'; boilers, 5 of 28'x44".

"James Howard," 1871.—Hull, 330'x56'x10'; engines, 2 of 34"x10'; boilers, 6 of 30'x40".

"J. M. White," 1844.—Hull, 250'x31'x8'4; engines, 2 of 30"x10'; boilers, 7 of 32'x42"; water wheels, 32'x15'.

"J. M. White," 1878.—Hull, 321'x49'x11'; engines, 2 of 43"x11'; boilers, 11 of 34'x42"; water wheels, 45'x18'6.

"John A. Scudder," 1873.—Hull, 302'x50'6x8'; engines, 2 of 28"x8'; boilers, 6 of 26'x40".

"John Kyle," 1870.—Hull, 296'x49'x8'; engines, 2 of 30"x10'; boilers, 7 of 26'x37".

"John B. Maude," 1872.—Hull, 240'x36'x7'6; engines, 2 of 22"x6'6; boilers, 4 of 26'x40".

"Jesse K. Belle," 1879.—Hull, 220'x41'x7'; engines, 2 of 22"x8'; boilers, 4 of 30'x40".

"Katie," 1871.—Hull, 300'x45'x10'; engines, 2 of 38"x10'; boilers, 9 of 32'x40".

"La Belle," 1869.—Hull, 238'x39'6x6'6; engines, 2 of 20"x6'6; boilers, 4 of 26'x38".

"Mary Bell," 1875.—Hull, 325'x56'x11'; engines, 2 of 34"x9'; boilers, 6 of 30'x42".

"Mary Houston," 1868.—Hull, 285'x40'8x7'8; engines, 2 of 22½"x7'; boilers, 5 of 24'x38".

"Mayflower," 1867.—Hull, 212'x34'x5'; engines, 2 of 20¾"x7'; boilers, 4 of 24'x40".

"Natchez," 1869.—Hull, 307'x43'x10'; engines, 2 of 34"x10'; boilers, 8 of 34'x40" water wheels, 42'x16'.

"Natchez," 1879.—Hull, 303'6x46'6x10'; engines, 2 of 34"x10'; boilers, 8 of 36'x42"; water wheels, 42'x16'.

"Nick Longworth," 1864.—Hull, 269'x48'x6'6; engines, 2 of 22"x7'6".

"Ouachita Belle," 1870.—Hull, 218'x38'x8'; engines, 2 of 28⅞"x8'; boilers, 6 of 30'x38".

"Princess," 1855.—Hull, 280'x38'x9'4; engines, 2 of 34"x9'; boilers, 6 of 34'x42"; water wheels, 40'x—.

"Paris C. Brown," 1878.—Hull, 262'6x39'x6'6; engines, 2 of 18"x7'; boilers, 4 of 26'x42".

"Ruth," 1865.—Hull, 309'x48'6x9'6 engines, 2 of 30"x10'; boilers, 6 of 30'x44".

"Richmond," 1867.—Hull, 340'x50'x9'; engines, 2 *low pressure*, with cylinders 60"x10'; boilers, 6 of 28'x63".

"Robert E. Lee," 1866.—Hull, 300'x44'x10'; engines, 2 of 40"x10'; boilers, 8 of 32'x42"; water wheels, 38'x16'6".

"Robert E. Lee," 1876.—Hull, 315'x48'6x10'6; engines, 2 of 40"x10'; boilers, 9 of 32'x42"; water wheels, 40'x17'.

"R. R. Springer," 1879.—Hull, 294'6x41'6x8'4; engines, 2 of 24"x8'; stern wheeler; boilers, 6 of 30'x40"; water wheel, 32'x—.

"Robert Mitchell," 1871.—Hull, 270'x40'3x8'; engines, 2 of 24"x8'; boilers, 4 of 28'x40".

"Susie Silver," 1870.—Hull, 260'x40'x6'6; engines, 2 of 22"x8'; boilers, 4 of 26'x40".

"S. H. Parisot," 1882.—Hull, 225'x41'x8'; stern wheeler; engines, 2 of 23"x7'; boilers, 4 of 28'x45"; wheel, 23'x28'.

"Thomas Sherlock," 1873.—Hull, 285'x45'x8'6; engines, 2 of 24"x8'; boilers, 5.

"Tom Jasper," 1867.—Hull, 255'x41'x6'6; engines, 2 of 26"x7'; boilers, 4 of 22'x42".

"Thompson Dean," 1871.—Hull, 306'x46'x9'; engines, 2 of 30"x10'; boilers, 7 of 30'x38".

"U. P. Schenck," 1876.—Hull, 251'x42'x6'6; engines, 2 of 21"x7'; boilers, 3 of 30'x42".

"W. P. Halliday," 1879.—Hull, 285'x41'x9'3; engines, 2 of 24"x10'.

"Will Kyle," 1879.—Stern wheeler; hull, 265'x46'x6'4; engines, 2 of 22"x7'; boilers, 4 of 30'x42"; water wheel, 24'x34'.

"Wild Wagoner," 1864.—Hull, 248'x38'x6'; engines, 2 of 24 $\frac{3}{4}$ "x7'6; boilers, 5 of 24'x38".

"Wade Hampton," 1870.—Hull, 218'x38'x8'; engines, 2 of 28"x7'; boilers, 6 of 28'x38".

"Will S. Hays," 1883.—Hull, 305'x44'x9'; engines, 2 of 28"x10'; boilers, 6 of 28'x50"; water wheels, 34'x15'6".

"Hudson," 1886.—Hull, 223'x37'x6'; engines, 2 of 20'x6'; stern wheeler; 4 boilers; water wheel, 23'x27'.

OHIO RIVER STEAMBOATS IN 1860.

"James Trabue."—Hull, 180'x30'x6'; engines, 2 of 16 $\frac{1}{2}$ " cylinders by 7 feet stroke; boilers, 2-28 feet long by 40 inches diameter; steam pressure, 135 lbs. per inch; water wheels, 27 feet diameter by 8 feet face; diameter of shaft, 10 inches.

"Laurel Hill."—Hull, 260'x32'x7'x4 feet draft; engines, 2-30"x8'; boilers, 4-30'x42"; water wheels, 38'x12' face; diameter of shaft, 16".

"C. D. Junior."—Hull, 200'x30'x7 deep by 3 $\frac{1}{2}$ feet draft; engines, 2-26"x8'; boilers, 4-28'x42", with 2-15" flues in each

boiler; water wheels, 36'x11', with 20 buckets in each wheel; diameter of shaft, 15".

"Belle Key."—Hull, 260 feet long, 34 feet beam by 7 feet deep by 4 feet draft; engines, 2 of 25" by 10 feet; boilers, 6 of 30'x40 inches, with 2-14" flues in each boiler; water wheels, 38'x12' face, with 20 buckets in each wheel; diameter of shaft, 17 inches; consumption of fuel every 24 hours, 720 bushels of coal; revolutions water wheels, 15 per minute.

"R. W. McRae."—Hull, 184'x34'x7'6"; engines, 2 of 25"x7"; boilers, 4 of 26'x40"; water wheels, 29'x11'; diameter of shaft, 15".

"J. H. Bell."—Hull, 173'x36'x7'; engines, 2 of 22¼"x6"; boilers, 3 of 28'x40"; water wheels, 29'x10'; shaft, 16".

"Huntsville No. 2."—Hull, 255'x40'x9'; engines, 2 of 23½"x8"; boilers, 5 of 32'x42", with 2 flues of 16" diameter in each boiler; water wheels, 38'x12', with 20 buckets in each wheel; diameter of shaft, 17"; revolutions of water wheels, 17 per minute.

"Peter Tellon."—Hull, 265'x35'x8'6"; engines, 2 of 27"x9"; boilers, 5 of 32'x42", with 2-16" flues in each boiler; water wheels, 40'x12', with 21 buckets in each wheel; diameter of shaft, 17".

"Antelope."—Hull, 264'x34'x8' by 3 feet draft; engines, 2 of 28"x9"; boilers, 5 of 34'x42", with 2-16" flues in each boiler; water wheels, 40'x12', with 21 buckets in each wheel; diameter of shaft, 17"; revolutions of water wheels, 16 per minute.

"S. F. J. Trabue."—Hull, 265'x35'x7'; engines, 2 of 32"x9"; boilers, 5 of 34'x42"; water wheels, 39'x13½'; diameter of shaft, 17".

"Belle Sheridan."—Hull, 275'x35'x7'; engines, 2 of 34"x9"; boilers, 5 of 36'x42", with 2-16" flues in each boiler; water wheels, 38'x14'; diameter of shaft, 18"; revolutions of water wheels, 15 per minute.

"J. H. Lucas."—Hull, 230'x34'x6'6"; engines, 2 of 25"x7"; boilers, 4 of 28'x40"; water wheels, 29'x11'; shaft, 14".

"High Flyer."—Hull, 250'x32'x6'; engines, 2 of 24½"x7'6"; boilers, 4 of 28'x40"; water wheels, 33'x10'; shaft, 16".

"T. C. Twichel."—Hull, 240'x36'x7'; engines, 2 of 22½"x9"; boilers, 4 of 30'x40"; water wheels, 32'x11'6".

"Fanny Bullitt."—Hull, 240'x32'x6½'; engines, 2 of 21"x8'; boilers, 4 of 28'x38", 14" flues; water wheels, 32'x10'.

"Rainbow."—Hull, 230'x35'x6½'; engines, 2 of 26"x8'; boilers, 5 of 26'x40", with 15" flues; water wheels, 32'x12'.

The steam pressure under which these boats run was from 135 lbs. to 140 lbs.



CHAPTER V.

LONG ISLAND SOUND.

PROVIDENCE AND STONINGTON LINES.



AFTER the "Fulton" and "Connecticut" were withdrawn from the New York, New Haven and New London route, in 1822, they were put on the New York and Providence route, stopping at Newport. This was deemed at the time as a most hazardous adventure, but Capt. Elihu S. Bunker, who was in command of the "Connecticut," and interested in the line, in the language of a large steamboat owner, who was at that time on one of the steamboats on the Sound, says: "Capt. Bunker was a bold man; the terrible seas in doubling Point Judith had no terror for him; although many of his best friends advised him not to risk life and property in the dangerous experiment, the line nevertheless was started and proved a success."

22 X These² boats run as The New York and Rhode Island Steamboat Co., making one round trip each a week during the season until November, when the "Fulton" was withdrawn for the winter and the "Connecticut" continued on the route with one trip per week until the ice closed navigation. Passenger fare from New York to Providence, \$10; time between New York and Newport averaged 25 hours. X They continued to run during 1823 from the opening of navigation, as they had in the previous season, with an increase of business. During the year the owners of the packets had two bills offered in the Rhode Island General Assembly, one restricting the landing of steamboat passengers on the shores of the State, and another imposing a tax of 50 cents on each passenger by steamboat, but neither bill became a law. This was the fate of all new steamboat lines during this early period, by the placing of every obstacle in their way to a free competition by the owners of the lines of packets. During 1824, these boats run as in the previous year, with the exception that during a portion of the time they stopped at New London each way.

During 1825 a new boat was completed, called the "Washington." She was 131 feet long, with a *pair* of beam engines. Each engine was connected by gearing, entirely independent of the other, to its own water-wheel shaft, so that they were able to go ahead with one engine and back with the other at the same time, if it was desired. This was the first steam vessel with a *pair* of beam engines of which there is any record. She was fitted up superior to the other boats of the line, having a large cabin for those days, and better accommodations for passengers, and was rigged with a mast and sails, which latter she would use when occasion would permit. ~~X~~The three boats run, during the season of 1825, from Providence and New York, four days in the week.~~X~~ During 1827 the "Washington" had extensive improvements made to her, so that when she resumed her place on the line, in 1828, she had a cabin on deck for ladies, and sixty or more berths in the lower cabin.

In 1828, the "Benjamin Franklin" was built, somewhat larger than the "Washington," with a pair of the same kind of engines. This vessel was built, as was the "Washington," under the supervision of Capt. E. S. Bunker, and was a further improvement over the others, and was fitted with masts and sails.

In the latter part of 1829, another new boat was completed for the line, and named the "President." She had also the same style of engines as the "Washington," but was larger than her predecessors on the line, being 205 feet long, and of much better speed, and was also fitted with a ladies' cabin and 137 berths for passengers. All three of these boats were built very heavy, sufficiently so for sea navigation. They also had heavy copper boilers. The "Benjamin Franklin" is credited with having made a trip from New York to Providence, dock to dock, in 15 hours and 23 minutes. The "President" commonly made the run in 16 hours.

~~X~~In 1827, the "Chancellor Livingston" was taken off the Albany route, her hull rebuilt and a new engine of 56-inch cylinder by 6 feet stroke, of the "square engine" type, put in by James P. Allaire, to fit her for navigation of Long Island Sound; and in the spring of 1828 was placed on the New York and Providence route as an opposition boat. This was one

of the North River line boats; the company having gone out of business, the floating property was disposed of. The fare, which had previously been \$10, was now reduced to \$6.00, and a lively competition existed during the year. The old line run the "Fulton," "Washington," and the "Connecticut." During 1829, the "Washington," "Fulton," "Benjamin Franklin," and the "Chancellor Livingston," formed the line, the "Connecticut" having been sold to parties in Maine.

In May, 1831, the "Washington," while on a trip from New York, and in the vicinity of Milford, Ct., was run down by the "Chancellor Livingston" and sunk, proving a total loss. There were 52 passengers on the "Washington" at the time, but they were all transferred to the "Chancellor Livingston" with safety. The cause of the collision was the want of an experienced man as pilot on the latter vessel at the time, the regular pilot having remained ashore during that trip. The "President" and the "Benjamin Franklin" run as the "New York and Boston Steamboat Company" during this year, while the "Chancellor Livingston" was the opposition boat, with fare at \$4.00.

During the summer of 1831, the Rhode Island and New York Steamboat Company put on the route a new boat that had just been completed for them, named the "Boston," which was built under the supervision of Capt. Comstock. This boat had two beam engines, and was the first steamboat on the sound routes without mast and sails. She run during this year in connection with the "New York and Boston Steamboat Company's" line, with the "Chancellor Livingston" still in opposition, with the fare reduced to \$3.00.

At the annual meeting of the directors of the Chancellor Livingston Steam Packet Company, in 1829, a resolution was adopted prohibiting the steward from placing decanters of brandy and spirits on the tables. This action created considerable stir. The meals on board the "Chancellor Livingston" had always been superb, and at these meals the contents of the decanters had played no unimportant part; to banish them would invite a strike from their patrons. The indignation was so strong that a letter from one of the directors soon found its way into print. The letter said that the directors "were not influenced by petty motives of economy

or gain, but hoped to do a little to aid the cause of reform." The letter concluded as follows:

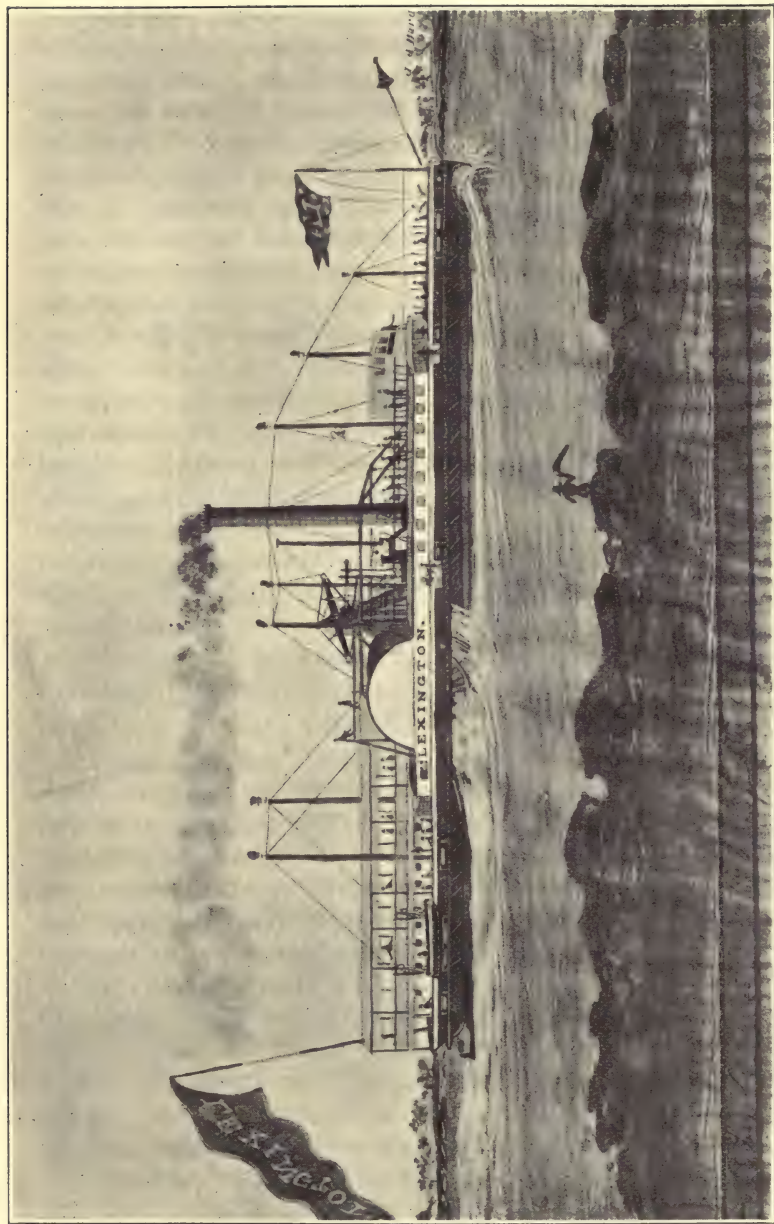
"The tables are now supplied with red wines of good quality and pleasant flavor, as well as of good tendency in its effects upon those who may be affected by the motion of the boat. In addition to all this, whenever any person may choose to order brandy or spirits, from a belief of their necessity, it will be immediately and cheerfully supplied from the bar, and the gentleman will hear no more about it unless he pleases." This was an early reform movement.

The season of 1832 opened with uncommonly brilliant prospects. New stage lines were opened, and all of the boats did a thriving business until midsummer, when the approach of the cholera made quarantine regulations necessary, and travel between New York and Providence was almost suspended. The steamboats were withdrawn. Some of them lay idle during July and August, while others ran excursion trips from other cities. The "Boston" made a number of trips in Boston harbor. From the latter part of June until about the first of September an effort was made to prevent persons entering Providence within ten days of their being in New York. Early in September the "Boston" again commenced her regular trips between Providence and New York. A few days later the "President" and the "Franklin" were on the route again, running under the style of the New York and Boston Steamboat Company. The fare by each line was \$7.00.

In the fall of 1832, the Providence Steamboat Company put in service their new boat, built during the year by Bell & Brown, of New York, and named "Providence." She was of about 400 tons, and had a single beam engine 65 inches by 10 feet, built by West Point Foundry, at New York.

The boats maintained the even tenor of their way during 1833 and '34. The "President" and the "Benjamin Franklin" formed one line, while the "Boston" and the "Providence" the other line. The "Connecticut" left for service elsewhere in 1829, and the "Chancellor Livingston" in 1833 for the coast of Maine.

In 1835 Cornelius Vanderbilt had built by Bishop & Simonson, of New York, a boat for this route, named the



"LEXINGTON."

From a painting in possession of Charles Smith, who was a fireman on the vessel when burned.

X "Lexington." This may be termed Vanderbilt's first venture in Long Island Sound navigation, though he had the "Nimrod" for a short time before this running to Bridgeport, Ct. Her first trip from New York was made on June 1st, of that year, to Providence in 12 hours 28 minutes. She ran as a day boat for four months of that year, leaving New York Tuesdays, Thursdays and Saturdays, at 6 a. m., and having a special train from Providence to Boston for her passengers. The Boston and Providence railroad was opened for travel during the same month as the "Lexington" commenced running. The road at that time came down on the east side of the Seekonk or Pawtucket River, through Rumford to East Providence, where it crossed the India Point bridge, built by the company, to India Point, where was located the depot adjacent to the wharf of the New York steamboats. Fare was four dollars, and meals extra. X The other lines promptly reduced their rate to five dollars and found, and then began a lively competition that lasted as long as the "Lexington" remained that season. To draw travel to the "Lexington," Vanderbilt offered the inducement of a trip from New York to Providence or Newport and return for the regular fare of one-way. This is the first occasion found of excursion fare by steamboats. The old lines continued the night service from New York, but left Providence at noon just after the arrival of the train from Boston.

B X At this time the most popular route between New York and Boston was via Providence. The steamboats leaving every day of the week carried full passenger lists, and four stage lines transported the passengers between Boston and Providence. X So influential were these lines that they did not anticipate any very serious opposition from the railroad when opened on June 15th, 1835. "Let the train run off the track when going thirty miles an hour and kill two or three hundred people a few times, and people would be ready to stick to the stages." They considered "steam cars an invention for checking the too rapid growth of the population, by slaughtering three or four thousand persons per annum." There was a lively competition between the stage lines as well as the steamboats, and it is said that one company having offered to carry passengers for nothing,

the opposition offered equal inducements, and gave them their dinners, whereupon the first line offered free passage, dinner and a bottle of wine. The oldest inhabitant says the latter was at once accepted, as the more agreeable to the traveller.

Just before the opening of the railroad the captain of the "Benjamin Franklin" was sued for refusing to receive on board his vessel the agent of the Tremont Stage line that run between Boston and Providence in opposition to the Citizens' Stage line, that was run in the interests of the steamboat company. The agent had been in the habit of going from Newport to Providence on board the steamboats soliciting passengers for his stage line, and for this refusal he brought an action against the captain of the vessel. The court decided that the latter could discriminate whom to permit on board the vessel, and the jury brought in a verdict for the captain.

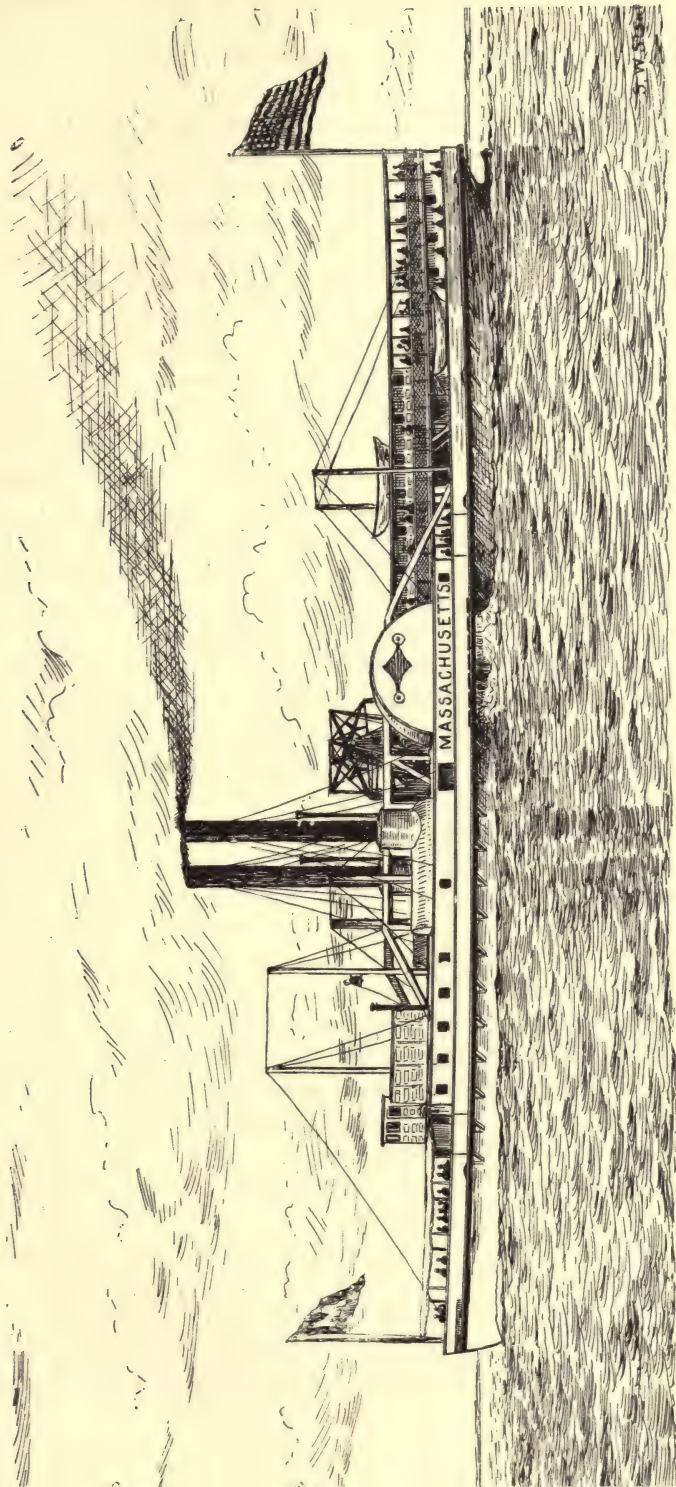
In the month of January, 1836, the "Bunker Hill," which belonged to Sanford's Hartford line, came to Providence as an opposition boat for a time, with the fare at \$8.00.

In April of the same year, the "Massachusetts," built by Bell & Brown, of New York, was running to Providence. She was much larger than her predecessors, and was fitted with a pair of beam engines, and had copper boilers, constructed at the Allaire Works, New York. Her cabin is thus described: "The principal cabin in the "Massachusetts," a vessel running on the line between New York and Providence, is 160 feet in length, about 22 feet in maximum breadth, and 12 feet in height; and what adds greatly to its convenience and capacity, it is entirely unbroken by pillars or any other obstruction throughout its whole area. I have dined with 175 persons in this cabin, and, notwithstanding its numerous assembly, the tables, which were arranged in two parallel rows, extending from one end of the cabin to the other, were far from being fully occupied. The attendance was good, and everything was conducted with perfect regularity and order. There are 112 fixed berths ranged around this cabin, and about 100 temporary berths can be erected in the middle of the floor. Besides these, there are 60 fixed berths in the ladies' cabin, and several temporary sleeping places can be erected

in it also. The cabin of the 'Massachusetts' is by no means the largest in the United States. Some steamers have cabins upwards of 175 feet in length. These large saloons are lighted by argand lamps, suspended from the ceiling, and their appearance, when lighted up and filled with company, is very remarkable. The passengers generally arrange themselves in parties at the numerous small tables (into which the large tables are converted after dinner) and engage in different amusements." Her owners shortly after bought an interest in the "Boston," and made an arrangement with the Providence Steamboat Company, so that the "Massachusetts," the "Boston," and the "Providence" were advertised as the Boston and Providence Railroad line. This was the first step in the formation of the noted Transportation Company that subsequently held such power in the water transportation on Long Island Sound. It was at first an association or partnership known as the Boston and New York Transportation Company, but afterwards became a corporation known as the "New Jersey Steam Navigation Company."

The "Lexington" was back in April, 1836, and running opposition with the fare at \$3, while the railroad line was holding at \$5 and found, but returned to the Hartford route in July for the remainder of the season. People were afraid to travel by her even then, but she was so fast and the fare such an inducement that she was well patronized. The Transportation Company had, prior to 1836, taken in the "President" and the "Benjamin Franklin," and during the latter year had added the "Rhode Island" that had been built for them by Bell & Brown, of New York, with a "square" engine constructed by James P. Allaire. Her first trip was made in 12 hours and 24 minutes. Travel began to increase, and 200 or 300 passengers a trip began to be the rule rather than the exception.

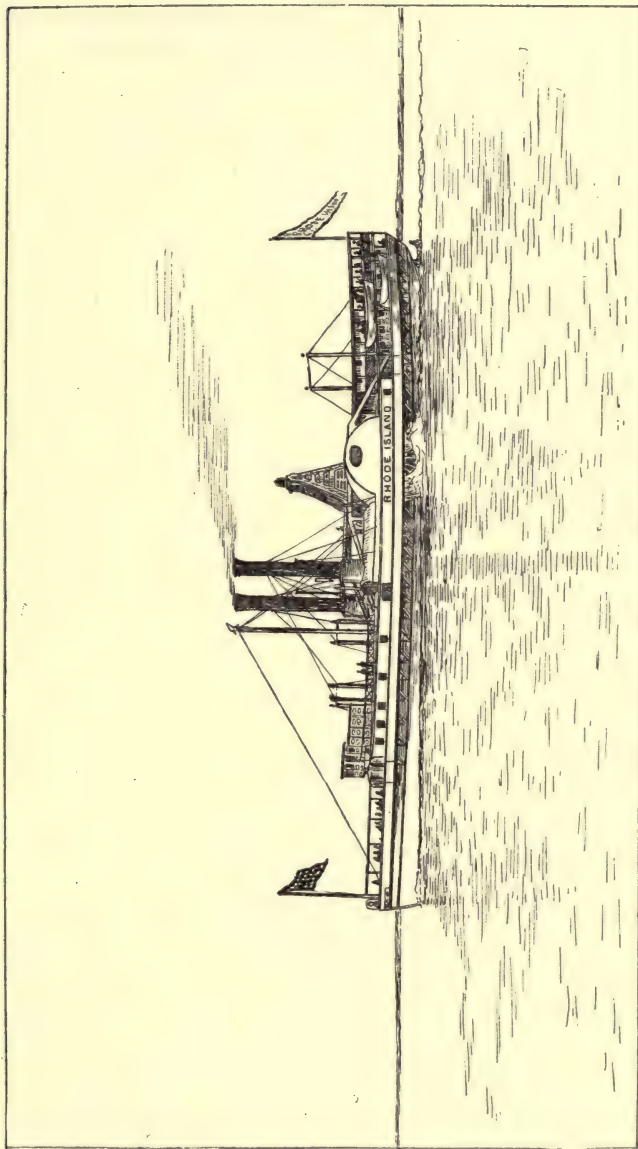
But the Transportation Company were not satisfied, for Vanderbilt was keeping them on the move most all the time, even with all their strong financial backing and business ability in the company. The "Lexington" was a thorn in their side, for she was a much faster boat than any thing they had afloat, so they now determined to have one, if possible, that could not be beaten. They contracted with William Brown, of New York, who was one of the best-known shipbuilders at that



"MASSACHUSETTS" OF 1836.

period for river and Sound steamers, who built for them, in 1836, the "Narragansett," that was pronounced to be of a model of a very advanced type, of about the same general dimensions as the "Rhode Island," was sponson-sided fore and aft of the water wheels, and drew about five feet of water with an average load, as most of these boats did at the time. Her hull was strapped diagonally with bar-iron, as was the practice in later years with wooden hulls, and this is believed to have been the first instance where such means were used to stiffen the hull of a vessel. Her motive power was a horizontal engine on the main deck, built at the Novelty Iron Works. But with all her fine model she was an exceedingly crank vessel, as her lines would denote, and would roll down on her beam ends under a small provocation. The proportion of beam to length was 1 to 8. The vessel is spoken of at the time: "The finest of these sea boats, and, indeed, the finest steamer which I saw was the "Narragansett," plying between New York and Providence. It could hardly be credited that this vessel plies regularly between New York and Providence. It will be seen by inspecting the map that during fifty miles of the voyage, extending between New London and Newport, she is quite exposed to the roll of the Atlantic ocean, and, notwithstanding this, she makes her passages with great speed and regularity." She was often laid up for repairs, as her engine was found after a short time in service to be too powerful for the hull, and could not stand the heavy strain when she was driven. If they thought they were going to drive off the opposition with the "Narragansett," they were mistaken in their rival, for the addition of a new boat to the fleet made it so much more interesting for all concerned. X Either the "Lexington," or the "Cleopatra," both belonging to Cornelius Vanderbilt, was on hand with the fare at \$1.00 at times, and by chartering a special train he several times succeeded in getting his passengers into Boston ahead of those by the other line X

The Boston and Providence R. R. Co., in 1837, was called to account by the Rhode Island legislature, and a measure passed, bringing to their notice of their having departed from the spirit of their charter in refusing the free access of all steamboats to their wharfs for the receiving and discharging



“ RHODE ISLAND ” OF 1836.

of all through passengers and freight. They had for some time prior to this action been interested in some of the old-line boats, and they did not desire to see the business they had developed fall into other hands, so they took this means of breaking up opposition, but it proved ineffectual.

When the "Lexington" left the Providence route, in 1836, the vessel was run on the New York & Hartford line, where Vanderbilt was having a glorious old time in his contest with Sanford, but was back again in March, 1837, to keep things lively on Narragansett Bay. The vessel had, in the meantime, been fitted with berths for night service. Then, in 1838, the vessel was for a portion of each year either on the Providence or the Stonington route, the Providence & Stonington Railroad having been opened for passenger service on November 10th, 1837. The road then entered the city of Providence to the southeast, and striking the shore of the harbor to the northwest of Sassafras Point and ended on the shore about opposite Fox Point. The connection with the Boston & Providence Railroad was by means of a ferryboat built in 1834, named "Stonington," 115 feet long and owned by Jesse L. Moss, that run to India Point depot just across the river. The railroad companies subsequently owned the ferry. The opening of this railroad made a change necessary in the running of the Transportation Company's boats. The "Rhode Island" and the "Narragansett" were now placed on the Stonington route, and the "Massachusetts" was continued on the Providence line. A little later, Cornelius Vanderbilt and the Transportation Company each had a vessel on the Stonington line in connection with the railroad, by agreement with the Providence & Stonington R. R. Co.

In the same year the Atlantic Steamboat Company was formed of J. W. Richmond and others, the former having been at one time interested in the old line, and in June, 1838, had completed for them by J. S. Eddy, of Providence, the "John W. Richmond," of about 500 tons, with a "square" engine of 48 inches by 11 feet, built by the Providence Steam Engine Company. X The Railroad line immediately reduced their fare between New York and Providence direct to \$2.00, and by steamboat and Stonington railroad to \$3.00. The Stonington line boats at this time left New York at 6 P. M., from Pier 4, N. R.,

and arrived at Stonington usually about 4 A. M., and passengers at Boston at 9 A. M. When the "John W. Richmond" was finished, but before being placed in commission, the officers of the Railroad line concluded that she was a more able boat than any of their fleet, so to be prepared to make a good stiff fight, the "Narragansett" was made ready for service on the Providence route. It must be remembered that the relations between the Transportation Company and Vanderbilt at this time were very pleasant, as they each had a steamboat running on the regular Stonington line. On the first return trip east the "Narragansett" made the best time, but this state of affairs did not last long, as the "John W. Richmond," after wearing off the stiffness of her engine, began to improve in speed, and the "Narragansett" could not pass her. This condition of affairs could not be endured forever, so as a last resort the Railroad line offered Cornelius Vanderbilt \$60,000 for the "Lexington," provided she could beat the "John W. Richmond." This proposition was accepted, and the "Lexington" was placed in the regular line. She was commanded by Capt. Jacob Vanderbilt, whose reputation for daring deeds with a steamboat has been equalled by few.

There was some excitement in traveling on the Sound in those days. Races were the rule, and they were not always unattended with danger. Once, in particular, there was a trial of some moment in point of speed between the "Lexington" and the "J. W. Richmond." The latter boat had laid in Newport over night and in the morning she started out and ran to Stonington. The train from Boston was about due and the "Lexington," which should have met the train, had not arrived. The "John W. Richmond," accordingly, ran in and offered to take the passengers to New York, which offer was accepted. But while the latter boat waited for the train the "Lexington" arrived. Presently the train arrived also and part of the passengers went by one boat and the remainder by the other. The two boats started at about the same time, with the advantage in favor of the "Richmond." For ten miles or more down the Sound there was no perceptible change in the position of the boats to each other. But shortly after dense clouds of smoke were noticed coming from the smoke-pipe of the "Lexington," and she was seen to be gaining upon the "Richmond."

But this had not escaped the eye of the captain of the "Richmond." Upon leaving Stonington they had picked out the most resinous wood and placed it close at hand for use when wanted, and that time had now come, for the orders were, "put in the fat wood and let her go." And go she did, for the roar of the fires could be heard all over the boat, and at each revolution of her wheels she trembled from stem to stern. She slowly and steadily opened the gap between the "Lexington" and herself all the way to New York, arriving there half an hour ahead of the "Lexington." The latter was, no doubt, the faster of the two boats, but there was no denying the fact of the "Richmond" having beaten her for once. The "Lexington" was now running in the interest of the Transportation Company, with the "Richmond" as the opposition boat. Fare by the "Richmond" was \$3.00, while by the regular line it was lowered to \$1.00. The Transportation Company purchased the "Lexington," in December, 1838, and paid about \$72,000 in all for the vessel. This was just prior to the organizing of the New Jersey Steam Navigation Company. The Old line used all means to break the opposition line. If the "Richmond" was delayed so her passengers could not take the morning train to Boston, they would not allow the Boston & Providence Railroad Company, under an old contract, to send them through by a special train, and several times her passengers were compelled to wait nine hours in Providence for a train to Boston. In spite of these disadvantages, the "Richmond" had done a good business, until a sufficient amount of her stock was obtained by the Transportation Company to get a strong representation in the company when that ended her opposition. The Atlantic Steamboat Company had given the Old line all the opposition and fight in business they cared for, and, coming from former associates, made it all the more bitter. She was sold in 1840 for service on the Boston & Maine route, where she run until 1843, when she was burned. In the fall of 1839, the "Mohegan," a smaller boat than any of the others on the route, was put on by the Transportation Company's line. She was fitted with one of Lighthall's Horizontal beam engines, was a very light-built boat, and in heavy weather it was hard work to keep her up to the wind.

In the following winter, on January 13th, 1840, occurred

the burning of the "Lexington" while on her trip from New York to Stonington, when off Eaton's Neck, Long Island. The night was very cold, the temperature being below zero, and the ice was making very rapidly in the Sound. They had just begun to make use of coal for fuel in her boiler, and there had been trouble with her blowers on her last trip from Stonington, making it necessary to lay up for repairs. The accumulation of ice, and she being one of the strongest boats of the line, it was thought best to place her on the route instead of one of the regular boats. She left New York at 4 P. M., with at least 150 persons on board and a large quantity of freight, of which there was about 150 bales of cotton. About half-past seven o'clock and when off Eaton's Neck, on the Long Island shore, and some four miles from land, there was an alarm of fire, but where it first started, none of those who were saved—of which there were but four—had any knowledge.* Stephen Manchester, who was the pilot and one of the survivors, relates his experience, in part, as given in a United States Senate document of the Twenty-sixth Congress: "I was in the wheel-house, at the wheel, when the alarm was first given; it was about half-past seven o'clock in the evening. I was first notified of the danger by some one who came to the wheel-house door and told me that the boat was on fire—do not know who that person was. My first movement was to step out of the wheel-house and look aft. I saw the upper deck on fire all around the smoke-pipe and blazing up two or three feet, perhaps, above the promenade deck. The flame seemed to be a thin sheet, and, apparently, but just commenced: the blaze seemed to follow up the smoke-pipe and was all around it. I again went into the wheel-house, caught hold of the wheel, hove it hard aport and steered the boat head to land. I thought from my first view of the fire that it was a doubtful case whether it could be extinguished. We were, when the fire broke out, about fifty miles from New York, off Eaton's Neck, and some four miles from the Long Island shore. As I

* A marine engineer of prominence, who was in service at this date, stated to the author several years ago, that probably the want of experience in the use of the blower may have had something to do with the primary cause of the fire. Also, that a can of varnish in the freight was placed too close to the smoke chimney.

got the wheel hove over hard aport, Captain Childs came into the wheel-house, he put his hand on a spoke of the wheel and at that moment the rope gave way. At this moment the smoke came into the wheel-house so violently that we were obliged to leave it. I don't recollect having seen Captain Childs afterwards. I called to those on the fore-castle to get out the fire engine and buckets. The engine they succeeded in getting out, but I did not see any of the buckets, except two or three which we found afterward on the fore-castle. I believe that the ropes were not parted by the strain, but were burned off." After he gave his experience in helping to launch a lifeboat, and the attempts to stay the progress of the flames, and the making of a raft from a spar and flagstaff with a portion of the bulwarks; also throwing overboard four baggage cars after being emptied of their contents, with a line attached. "Among those who remained to the last was a Mr. Van Cott, Mr. Hoyt, and Mr. Harnden, of the express: they were all confined to the forward deck. At 12 o'clock, I left the wreck and eased myself down upon the stage or raft; from that I got on a bale of cotton, on which there was already one man. After floating around on the bale until daylight, about which time my companion fell from the bale and went down without a struggle; his sufferings from the cold were intense. The wreck, I think, sunk about 3 o'clock. A short time after sunrise, I recollect seeing a sloop to the windward. I managed to put a handkerchief upon a piece of board and raised it up. I was picked up by the sloop "Merchant," Captain Meeker. I was taken to the house of Captain Godfrey, at Southport. In my opinion, the fire originated from the heat of the smoke-pipe, which was communicated to the woodwork. I have frequently seen the smoke-pipe red hot, and saw it so on the last night. I do not know whether the red heat extended to the flange or not. The cotton was piled within perhaps a foot of the steam chimney."

Capt. Chester Hilliard, who was one of the survivors, says, regarding the launching of the boats: "I left the main deck and went on the promenade deck. Soon after I got up I thought the people on board seemed to be stupidly determined to destroy themselves, and the boats also, their only means of safety. I repaired to the starboard boat, which they were lowering away. They got the boat partly over until she took

the water, and then some one cut the forward tackle, when she filled and went astern. I think about twenty persons were in her then. The other boat was lowered and went down in pretty much the same way, being full of passengers. At that time the fire got going so that I made up my mind 'it was a case.' He also relates taking to the bale of cotton and having for a companion one of the firemen named Cox, who succumbed to his exposure before daylight. "When I saw the sloop, I waved my hat to excite their attention, and they bore down and picked me up. She was the 'Merchant', from Southport, Captain Meeker. I know of no other persons who have done so except the steamer "Statesman." Captain Meeker had to take out part of his cargo in order to get the sloop over the bar. It was about 11 A. M., when I was picked up. They picked up two men alive and two dead bodies. One was Manchester, the pilot, the other was Charles Smith; he was on the wheel-house. The pilot was pretty much gone, and I thought the other seemed better. Smith was a fireman on the 'Lexington.' The second mate, David Crowley, took refuge on a bale of cotton also, and floated about until he struck the ice on Wednesday morning, about eighteen miles east of Old Field Point, and walked to a house of Mrs. Mary Hutchinson, who gave him good care after his exposure. The number of passengers and the crew is believed not to have exceeded one hundred and fifty. Fireman, Charles Smith, was living at Providence, R. I., a few months ago.

From the testimony given before the court of inquiry it was found that the fire was communicated to the promenade deck by the intense heat of the smoke-pipe and steam chimney. That the "Lexington" was a first-rate boat, with an excellent steam engine, and a boiler suitable for burning wood, but not coal with blowers attached, and that the carrying of cotton in any quantity on passenger boats should be condemned. David Crowley, the mate, died at Providence, R. I., two years ago.

The "Lexington" was built in 1835, by Bishop & Simonson, for Cornelius Vanderbilt, but he had sold her some months previous to her destruction. The hull was 207'x21'x11', with paddle wheels 23 feet diameter by 9 feet face; was fitted with a beam engine built by the West Point Foundry, having a

cylinder 48 inches diameter and 11 feet stroke. Charles W. Copeland was Superintending Engineer of the West Point Foundry at the time. The hull of the vessel was heavily built, frames close together and of large size for that class of vessel, and fitted with a "Towne" latticed truss on either side to strengthen the hull proper. This was the first time the truss was made use of for a similar purpose. She had a wide, square stern, and with a very high and short hog frame that, taken all in all, would not be called a handsome steamboat to-day. For the artificial draft to the furnaces of the boiler there were two fan blowers, each 30" diameter by 26" face, that were run by belts from a drum on the shaft of the main engine. There was the usual frame casing around the steam chimney.

The New Jersey Steam Navigation Company, the successor of the Transportation Company, was chartered by the State of New Jersey, in February, 1839, with a capital of \$500,000, most of the stock being held in New York City. The board of directors, in 1840, were M. O. Handy, Elisha Townsend, and Moses H. Grinnell, of New York, and M. B. Ives and R. S. Williams, of Providence, R. I.

The Boston and Providence Railroad Company was a corporation that was financially sound, unencumbered with debt, and was able to make terms with the steamboat companies that were most favorable to their own interests. The New York, Providence and Boston R. R. Co., or Providence and Stonington R. R. Co., the majority of whose stock was held in New York, appears to have been weak financially for some years after its completion. It opened at a most unfortunate period for a new enterprise, during the financial panic of 1837. For this weakness the steamboat company made the railroad a mere appendage in their connections for the through travel by their exorbitant exactions.

In a report made in 1840, by the Engineer of the New York, Providence and Boston R. R. Co., there is much that is laid bare of the demands made in those early days by the owners of floating property. He says in part: "Steamboats, and of the first class, too,—and such are now those which run in connection with us—being indispensable to the route, should, of course, be paid such portion of the through fare as will not only defray expenses and repairs, but adequately remuner-

ate their proprietors, whether they be owned, as now, by an independent company, or by the Stonington or by the Boston and Providence R. R. Co., or by the two latter, jointly, does not affect the question. It is easy to determine what that fair portion is, and if, as heretofore, and under our existing contract, more be exacted by present co-partners in the route, we must look elsewhere, to the proprietors of other steamboats, or connect steamers of our own with the route. Nor is the latter alternative proposed in an exclusive or monopolizing spirit. For so secondary do I regard the cost of the necessary number of steamers in comparison with that of both, or even either, of the railroads between Stonington and Boston, that even were we, the Railroad Company, the proprietors of the steamers, it is problematical if it would not be better merely to keep them in readiness as a security against extortion rather than run them in opposition to, or the exclusion of, suitable steamers by whomsoever owned, which could be connected with the route on equitable terms. That, of course,—equitable terms—is all that any party will admit they claim; but such, surely, it must be admitted, are not the terms to which we have been compelled heretofore to submit, and to which, till the expiration of the coming January 1st of our existing contract with the steamboat company, we must yet submit, briefly, by the existing contracts. Of the *gross receipts* via railroad and steamboats, *seven-tenths are paid to the steamboat company*, who exclusively receive all the passage money hence—from New York or Providence—to Newport, and all that outside freight between this and Providence, provided one-half the whole freight transported does not pass over the Stonington Railroad, in which case the railroad company receives three-tenths of one-half of the outside freight. The steamers which run in connection with the Norwich Railroad, which road I doubt not will be adequately sustained by its participation in the general trade between New York and Boston, but mainly by the local travel of the populous country through which it passes, receive, and I understand, are adequately compensated at two dollars per passenger, as their proportion on that route between New York and Norwich. Steamers, generally, on the northern and eastern waters of our country, are compensated in about a similar ratio

or less, and, at any rate, as the routes from New York to Norwich, and from New York to Stonington, are alike, as is also the character of the trade, it is fair to presume steamers can run as cheaply to one place as the other: at least, as cheaply to us as to them. Nor is it material to further calculations that the proprietors of steamers running in connection with us have not been enabled to do so. Three boats, at most, one to be in readiness to supply the place of either, or to be run as a day boat thrice a week, would suffice our every purpose. The steamboat company now in connection with us are the owners of five steamers, four in commission. As good boats as required, and they should be the best in all respects, could be procured for, say, \$75,000, or for \$250,000, we could supply the boats we want. The capital invested by them probably exceeds \$400,000. The relative cost of running boats between Stonington and New York, compared with that of the outward passage touching at Stonington, and thence to Providence, is about in the proportion of five to eight, in favor of the former. At but a very inconsiderable additional cost to the railroad, the whole extra cost of the outward passage may be avoided by stopping the steamers at Stonington. But without further dwelling on what may have been prolific sources of expense to the steamboat company, we know enough, and enough has been said, to show that their expenditures are no criterion by which to determine what they must necessarily be. In enumerating the number required for all our purposes, three were mentioned as sufficient, one of which to supply the place of either on an emergency, and usually to be employed in the summer months *as a day boat*. I feel satisfied that a tri-weekly day line will be, next season, worthy of experiment. It will, at least, be a great public accommodation, will attract many to Stonington and thereby sustain the spacious hotel owned by the corporation, and will conclusively demonstrate the superiority of our route over all others, as by it, and it alone, can the journey between New York and Boston be performed in a day, and by daylight, as is easily practicable in thirteen to fourteen hours.

“It will be conceded that while it is the most expeditious route, we are not only enabled to transport by it as cheaply as by any other route, but yet, in order to insure the general pref-

erence to which it is entitled, our charges to the passenger must not exceed those to which he would be subject by other routes. In other words, the fare must be the same as it is, whether we take the route from New York to Boston via Stonington, or via Norwich, with neither of which can the direct route by steamers to Providence compete with the least chance of being ultimately sustained. That fare, as at present established, is \$5.00. The question is, is that the proper fare? Is it such as probably effects the object, to wit, the greatest revenue? The distance by either route is upwards of 200 miles, say, 215 via Stonington, and at least 236 via Norwich. We know of no instance in the chain of communication, of which the Stonington and Norwich Railroad are links, even from the interior of Georgia to Augusta, thence to Charleston, S. C., thence via Wilmington, N. C., and steamers and railroads to the City of New York, in which the fare is less than 4 cents per mile, while on the other hand it ranges up to 10 cents per mile, and certainly on the average is 5 cents. From Washington City to Baltimore, 40 miles, the fare per passenger is \$2.50; from Baltimore to Philadelphia, and from Philadelphia to New York, the distance being in either case about the same as that from Stonington to Boston, or equal to the united length of the Stonington and the Boston and Providence railroads, the fare is \$4.00, or exceeding 4 cents per mile. With admittedly superior accommodations on our route, and transported with a dispatch unknown on any road in the chain south of New York, the average price charged elsewhere, at all events, the minimum price charged would not certainly be an undue return to us, nor could it reasonably be complained of by the traveling public. Yet it is unquestionably true that, however reasonable the charges elsewhere may be, it is no criterion for us. A less price than is reasonable might, and in some instances, in my opinion, probably would, increase the net revenue; while in our case it may be not only just to the traveler, but conduce to the interests of the stockholders to increase it beyond the present fare."

For the purpose of comparison in the cost of traveling during the stage period, with that of 1840 by railroad and steamboat, the following items are presented for a trip from Boston to Baltimore, Md.:

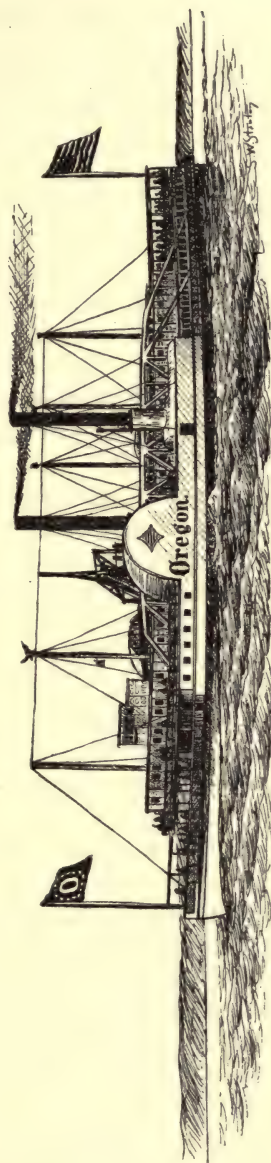
BY STAGES.

From Boston to Providence by stage, one day.....	\$3.00
Dinner on road50
Supper and lodging in Providence.....	1.00
Stage to New York, three days.....	18.00
Two nights' lodging on road.....	.50
Eight meals on road.....	4.00
Supper and lodging in New York.....	1.00
Stage to Philadelphia.....	9.00
Breakfast and dinner on road.....	1.00
Supper and lodging in Philadelphia.....	1.00
Stage to Baltimore, two days.....	10.00
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Total	\$49.00

BY RAILROAD AND STEAMBOAT.

Leave Boston 4 P. M., for Providence.....	2.00
Steamboat from Providence, or Stonington to N. Y.....	5.00
Supper on steamboat.....	.50
Board and lodging in New York, one day.....	2.00
To Philadelphia via Amboy and railroad.....	3.00
From Philadelphia to Baltimore.....	4.00
Breakfast and dinner on road.....	1.00
<hr/>	
Total	\$17.50

The steamboats to Providence in these early days must have been subjected to considerable delay at times in the harbor, for a chart of 1834 shows about 800 feet from Fox Point wharf, as then situated, was a shoal in the channel called the "Crook," having but $4\frac{1}{2}$ feet of water over it at mean low water. In dredging, at a later period, there were found and removed 67 piles in this locality, the remains of dolphins placed there about 1810. The conditions were not materially altered for ten years, though the City of Providence had some dredging done at this point. There was also a shoal called "Little Ohio" shoal, running from about off Fox Point to India Point, but leaving water of sufficient depth for the steamboats at the wharf. The first permanent improvement was in 1853 by the engineers' bureau of the War Department, when 9 feet of water was obtained at the "Crook," and in



“ OREGON.”

1873 the depth was increased to 12 feet at low water. There were propellers running to Providence, prior to this latter date, drawing 12 feet of water, but the bottom was so soft they were able to cut their way through at low water without any trouble. It would have been impossible to have run those large boats that run to Stonington from 1847, to Providence, with any success at the latter date.

The New Jersey Steam Navigation Company had disposed of their older boats a few years after organization, so that, by 1844, they had only the "Massachusetts," the "Rhode Island," the "Narragansett," and the "Mohegan." The "Narragansett" and the "Rhode Island" were sold in 1846, the "Narragansett," en route to New Orleans, going ashore at Mosquito Inlet, Fla., on October 28th, and proving a total loss, and the "Rhode Island" en route to the Pacific ocean, in 1850, was lost in the Gulf Stream.

In 1844, George Law began his career in steam navigation, and it was not long before he had to be reckoned with in the business on Long Island Sound. He purchased the "Neptune," with some others in that year, after she had finished her career in the coastwise service, and run her as an opposition boat to Providence during 1844, 1845 and 1846, and made it lively with the three or four other opposition lines that were there during those years. The regular line run occasionally to Providence during this period. This was the period of great changes in the control of large steamboat interests in this country. George Law and others, in 1845, built the "Oregon," and on April 1st, 1846, she was placed with the "Knickerbocker" on the regular mail line to Stonington, and, at the same time, the "Neptune" was withdrawn from Providence line. The "Oregon" did not remain on the Sound line but for about two years when sold to Daniel Drew, and in May, 1848, was running in the People's line to Albany. Some of these opposition lines were, in all probability, the entering wedges to the control of the New Jersey Steam Navigation Company, at a later date.

In 1845, the Providence & Stonington Railroad came under the direction of stronger hands, financially, Cornelius Vanderbilt, Daniel Drew, D. B. Allen, Eli Kelly, and W. K. Thorne, all of New York City, being a majority of the board of direc-

tors. These names indicate the two former persons in control. At the same time the New Jersey Steam Navigation Company passed into the hands of Daniel Drew as president, who retained that position in the company for over twenty years. This interest in the railroad was in control until 1851, Vanderbilt for some time having been engaged with his Nicaragua line to the Pacific ocean. At the same time the agitation of a better connection between the railroads at Providence than through the ferry was begun, but opposition in the city prevented its consummation until the building of the branch road by the Boston & Providence R. R. Co., and the Providence & Worcester R. R. Co., jointly, through Pawtucket, in 1847, that was finally completed in May, 1848, with the Union Station at the "Cove," and an all-rail route from Boston to Stonington was opened to the public. The "C. Vanderbilt" was built by C. Vanderbilt, but passed into the possession of the Stonington line and made her first trip on the 7th of June, 1847, and in July, 1849, the "Commodore," having been built by same parties, was placed in service.

While controlling the travel through Long Island Sound on the north shore, some of the same parties were engaged in opening another through route from New York to Boston. George Law and Cornelius Vanderbilt were interested in the completion of the Long Island R. R. to Greenport, and were in the board of directors for a few years after 1843. This completion was made possible through a loan from the State of New York of \$100,000 that was subsequently repaid. There has been only one other railroad in the State that has placed itself in the embarrassing position of paying a similar liability. The railroad company invested \$400,000 in floating stock, or steamboats, docks, etc., for the steamboat connections. Upon its completion to its terminus on July 29th, 1844, a train left Brooklyn, daily, at 8 A. M., connecting with one of the three boats that belonged prior to this to Cornelius Vanderbilt, the "Worcester," the "Cleopatra," or "New Haven," that made connections at Norwich with the Norwich & Worcester R. R., and at Stonington for Boston via Providence, each every other day. The time was 3½ hours to 4 hours by rail to Greenport, 2 hours on the Sound, and 4 hours on the Connecticut side to Boston. This was continued 1844, 1845 and 1846, and

was discontinued in March, 1847. They run for a time, to Providence, and to Newport. The United States government patronized this route to a large extent in the carrying of the eastern mail, express matter, etc. They carried over 150,000 passengers in the first year. This was the longest rail route between the two large cities, and the shortest water route at the time: one of the reasons why Providence lost so much travel in favor of Stonington at this period. The Long Island R. R. had nearly three years of good business, and then opposition came from every quarter. In the latter part of 1846 the New Haven & Hartford R. R. was completed, and Vanderbilt was running two boats to New Haven, with the mail to Hartford. He also controlled the Norwich line, and with George Law and others, had their hands on the Stonington line. Then in the spring of 1847, the Fall River line began operations. It had served their purpose, and in 1850, or 1851, the Long Island road went into the hands of a receiver.

The Long Island Railroad was again used as a link for a through route in 1873, the "Jane Moseley" being constructed in that year by Lawrence & Foulks, of Brooklyn, N. Y., for this service, to run across the Sound between Greenport and Newport, but this was continued only during the summer and part of the fall of that year. The vessel was sold the next year to parties in Baltimore for \$85,000. The last time it was tried was in September, 1891, and continued for a few months, when a connection was made through the Oyster Bay branch to Wilson Point on the Connecticut shore, there connecting with the Housatonic Railroad, and the New York & New England Railroad to the east, and was called the Long Island & Eastern State Line. In this case, there was the transfer of the train across the Sound, the fine steamer "Cape Charles" being used.

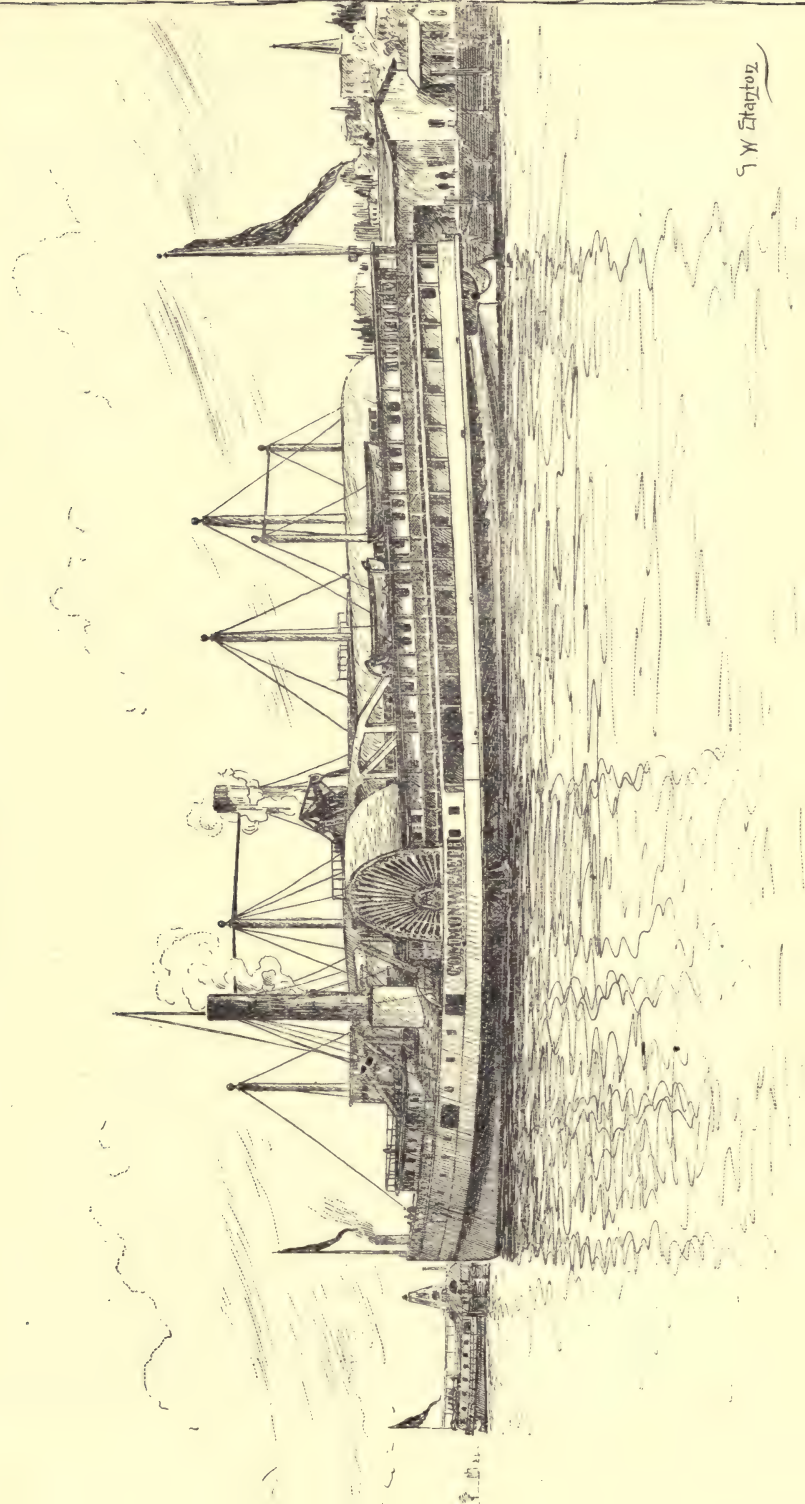
There was a line of propellers running to Providence from 1851, under the name of the Commercial Steamboat Company, having at first the "Pelican," the "Petrel," and the "Osprey," of 135'x24'x8' draft, and a few years later the "Curlew," of 150'x27'x9' draft, and after 1858 adding four still larger vessels, the "Albatross," the "Penguin," the "Kingfisher," and the "Sea Gull." This line was almost exclusively engaged in carrying freight, with the exception of a

short period, when engaged in a lively competition with the Stonington line, when passenger accommodations were fitted up to a few of their vessels, but they soon returned to the freight business exclusively. In 1862, the "Albatross" and the "Penguin" were sold to the Navy Department for the blockading squadron for \$75,000 each, and the "Falcon," the "Kingfisher," and the "Sea Gull" were chartered for a time by the War Department for transports, at from \$340 to \$390 a day. In 1865, their fleet of remaining steamers were sold to the Neptune line.

The "C. Vanderbilt" and the "Commodore" were in service on the Stonington line until 1856, when the latter was sent to the Hudson River on the New York and Troy line, then operated by the same company, and a few years later was returned to the Sound line again as a spare boat, until lost. The "Plymouth Rock" was built by Cornelius Vanderbilt, and passed into the hands of the company at once, in 1854, and run to Stonington until stranded in 1866, and the "Commonwealth" was purchased from the Norwich and New London Steamboat Company, in May, 1860, and run with the "Plymouth Rock" until destroyed by fire. The "C. Vanderbilt" was sent to the Hudson River in 1857. The transfer of the different vessels, from the Hudson River to the Long Island Sound, and vice versa, shows the intimate relations that existed between the New Jersey Steam Navigation Company and the Troy line, as controlled by the People's line, or New Jersey Steamboat Company, where Daniel Drew was interested so long. Capt. Jacob Vanderbilt had considerable interest in the Sound line until just before the changes in the company, but little, if any, in the People's line. There was a large dividend paid in 1863 by the company on the stock, the proceeds being from charters of some of their vessels to the government. The record shows the company received over \$350,000 from that source in 1862. Daniel Drew, at this time, held a controlling interest in the company, and was a factor to be taken into account in transportation along the main lines of travel, north and east from New York, both by rail and water. The larger stockholders in this line, at one time of their prosperity, were Daniel Drew, Jacob Vanderbilt and Bart Stone. This company transferred their steamers through

a so-called auction sale to the Merchants' Navigation and Transportation Company, that was chartered in Connecticut on December 29th, 1863. It included the "Commonwealth," "Commodore" and "Plymouth Rock." They continued to run on the Stonington line by the new company. The Stonington Railroad having been extended to Groton for some time, it was decided to change the terminus of the steamboat trains from Stonington to Groton, and on September 17th, 1860, the improvements for the boat service having been completed, the opening was made on that day. The steamboats continued to run from this end of the railroad until the destruction by fire on December 29th, 1865, of all facilities for making connections with the boats, when they were compelled to return to Stonington at once, making use of the old depot and wharf until new structures could be completed.

The first serious loss of this company was that of the "Commonwealth" on December 29th, 1865, by fire, while lying at her wharf at Groton, Conn. This involved a loss of about one million dollars, which includes the docks and other property of the railroad beside the steamboat, and was the cause of serious embarrassments to the companies' business. The tide was very low at the time of the fire, so it was impossible to move the vessel. Just nineteen days later, on January 17th, 1866, after they had moved to Stonington, the "Plymouth Rock," while on a trip from Stonington to New York, the weather being very thick and stormy, ran on a reef in the vicinity of Greenwich Point, and it became necessary to beach the vessel to save the lives of the passengers and crew. The vessel was subsequently gotten off and repaired. Then, to add to the list of disasters that followed the company at this time, the "Commodore" was beached near Horton's Point on Long Island shore on December 27th, of the same year, in order to save the lives of those on board the vessel at the time. She was caught in a severe gale about 10 P. M., and, refusing to obey her rudder, was thrown on her beam ends, and in this condition was driven across the Sound and came to anchor, but was found to be leaking so badly that her cables were slipped and the vessel was beached, but became a total loss. Her machinery during this trying period stood up well to the strain demanded of it. During the following month the com-



pany withdrew from service on the route, and the Stonington Railroad Company brought suit against the Merchants' Navigation and Transportation Company for breach of contract, and recovered judgment against them a few years later that was compromised for \$15,586. They now had plenty of troubles to contend with, and was finally legislated out of existence, in 1880, which act closed the career of a most remarkable line. The control of this company passed from the hands of Daniel Drew late in 1864 to some Boston capitalists, whose representative was James Fisk, Jr. This was the period when Daniel Drew was actively engaged in Wall street, and more especially with Erie R. R. stock.

The Neptune Steamship Company was organized principally by Providence capitalists, among the organizers being ex-Governor William Sprague, Henry Howard and Henry Lippitt, and George S. Howland. The charter was obtained in May, 1864, but they had begun active operations with the "Warrior" and the "Triton," in 1863. The first fleet that was commenced in 1863, the propellers "Galatea," "Proteus," and "Glaucus," were sold to the Navy Department, in July, 1863, before completion for \$160,000 each, which gave them a large profit, and the former vessel was disposed of by the Navy Department to the Haytien government, in August, 1865, for \$54,000. Of the fleet they had in service, the "Electra" was on the route in September, 1864, followed by the "Galatea" and the "Oceanus" in a few months. These vessels were 240'x40'x17'. The company also built the "Neptune," the "Nereus" and "Glaucus," and run to Boston with the smaller vessels, the "Metis," "Thetis" and "Doris," from August, 1865, to December, 1866, when the three former vessels were sold to the Metropolitan Steamship Company for \$300,000.

After the company had been running their propellers to Providence less than a year a spirit of expansion developed in the company, and, believing there was business for another first-class passenger line to Boston and New York, found supporters in the Boston interests of the Stonington line. These two interests were consolidated and a charter obtained from the State of Rhode Island, in May, 1865, under the name of the Merchants' Steamship Company, of Bristol, R. I. This was the beginning of the Bristol line. Its career was short and

full of trials. Contracts were now made for two large side-wheel steamboats, something larger and more in advance of the times than anything then afloat. These were known at a later date as the "Bristol" and "Providence," and were launched as such, but it was intended, when their keels were laid, to name them the "Pilgrim" and "Puritan." At the same time the company made contracts with the Providence, Warren & Bristol R. R. Co., and the Boston & Providence R. R. Co., for a railroad connection at Bristol, R. I., to form a through line from New York to Boston. Everything was progressing favorably, when they met with the loss of the "Commonwealth," and the stranding of the "Plymouth Rock," and later the "Commodore." Internal differences now began in the company, followed by the withdrawal of some of the Boston representatives. Financial trials were now added. The new boats were absorbing money very rapidly in their construction, the loss of their floating property and the extravagant management of their business so embarrassed them that they were compelled to close out their affairs in the winter of 1866. They made history very fast while in existence. These vessels were launched in June, 1866, but were not completed for service until June, 1867. They were bought in a partially finished state, in the winter of 1866-1867, by Charles E. Hill, Jacob B. Jewett and James Fisk, Jr., as trustees of a company that was subsequently formed and named the Narragansett S. S. Co., and finished by them. The "Plymouth Rock" was bought a few weeks later by the company. This company acquired the charter of the "Hope Navigation Company," chartered in January, 1860, in Rhode Island, which was amended by the Rhode Island legislature in January, 1867, and among other items being the change of the name to the Narragansett S. S. Co. The Boston interests in the company were at first represented through Eben D. Jordan, of Jordan, Marsh & Co., N. Briggs, J. Bodwell and H. Rogers.

It was expected in building these new vessels to make a stronger opposition line to the Fall River line than had heretofore existed. The Fall River Company had a year or so previous built two new vessels having superior passenger accommodations, and was thereby increasing their business very rapidly, and it was anticipated by a strong competition to

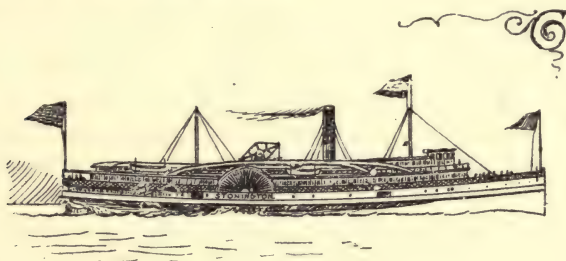
break down the growing popularity of the Fall River line and eventually to control all the water transportation east of New London, Conn. The Bristol line was as favorably situated as the Fall River line, so far as the calling of passengers at a late hour of the morning for the steamboat train. Not so, the Stonington line.

When the Fall River line, under the new management, was pushing the Stonington line very hard for the through business, the latter announced that "in summer and winter, and in storm and calm, the "Commonwealth" and "Plymouth Rock" invariably make the passage." This was after James Fisk became interested. That was the way the boats of a subsequent company were operated on the route. Did it pay in either case?

From the ruins of the Merchants' S. S. Co., sprang up three lines. The "Nereus," the "Glaucus" and the "Neptune" were purchased by the Metropolitan Steamship Company; the "Bristol" and the "Providence" were purchased by the Narragansett S. S. Co., that run from Bristol, R. I., for the years 1867 and 1868. The other boats of the line passed into the possession of the Merchants' Steam line that was subsequently chartered as the Providence & New York S. S. Co., who run the line to Providence until April, 1875, when it was consolidated with the Stonington Steamship Company. This company met with the loss of the "Oceanus," by fire, while at her dock in New York on May 24th, 1868, and, on August 30th, 1872, met with the loss of the "Metis," that was run into and sunk by a schooner when about four miles to the southward of Watch Hill light, resulting in the loss of twenty-eight lives. The license of the captain and the pilot in charge were revoked, and the license of the first pilot suspended. This, with other troubles of the company, brought about a change in the management. The two lines were consolidated under the name of the Providence and Stonington Steamship Company, which it actively retained until a few years since. This was done to prevent the possibility of a ruinous competition by a first-class line of steamers running direct to Providence, in which the Stonington R. R. Co. would have no interest, and over which it could have no control.

After the withdrawal of the Merchants' Navigation &

Transportation Company, in January, 1867, there was no line from Stonington until January 20th, 1868. During 1867, the Stonington R. R. Co. and others organized the Stonington S. S. Co., about 85 per cent. of the stock being held by the railroad company, and they purchased on August 28th, 1867, two of the four steamboats that had been constructed for the New York and Philadelphia outside line, and renamed them the "Stonington" and the "Narragansett." These vessels went out of service just prior to 1890.



"STONINGTON."

In 1865, the "City of Providence" x gunboat "Isonomania," x "Shamrock," was placed on the Providence route, where she run for more than a year. This was a beam-engine boat, of about 900 tons, built originally for Arthur Leary, at Brooklyn, N. Y., for the Chesapeake Bay line, but taken by the Navy Department before completion, and for which they paid \$152,000.

The Stonington Railroad Company saw, when the Merchants' Navigation & Transportation Company ceased operations, that the large revenue from passenger travel and freight brought by the boats would be lost to them, and make their road but a link in the chain of railroads from New York to Boston, and that something must be done to retain this business that they had enjoyed since 1837. It was only by one of those errors in management that will occur that the Fall River line did not have the "Empire State" on the Stonington route before the formation of the Stonington S. S. Co. They missed the chance of a lifetime.

The Stonington S. S. Co. had built, in 1873, the "Rhode Island," by Henry Steers, at Greenpoint, N. Y., which run to

Stonington as well as to Providence, until the "Massachusetts" was ready for service on the line in 1877.

The "Rhode Island" commenced to run as a day boat from the foot of East Twenty-third street, New York, to Stonington, Conn., in July, 1873, at 2.30 P. M., and landed her passengers in Boston about midnight. Left Stonington to return the same evening, after laying over about two hours, making the round trip in about 18 hours from the time of leaving New York. This was continued for two months only this season. The next year the vessel was placed on the day line again in July, but started from the Stonington pier on the west side of the city, at noon, stopping at East Twenty-third street at 1 P. M., and thence to Stonington. In returning, the vessel brought but passengers, express matter and light freight. This enterprise did not pay. It was a day line in one direction only, and landed the passengers for Boston and further north and east at a very uncertain hour to make railroad connections, or to obtain hotel accommodations in many cases in the larger cities. Besides, there was not the attraction for the tourist to patronize the day line for the passing panorama on the land side, as the vessel was generally too far out in the Sound to make it interesting, unless it was under an abnormal condition of the atmosphere for the summer months. Her best runs in 1873, from East Twenty-third street to Stonington, were, viz.:

	Hours.	Min.
July 16	6	19
" 29	6	24
" 30	6	17
Aug. 2	6	26
" 16	6	29
" 28	6	25
" 30	6	16
In 1874, July 15	6	23

The Stonington line, as reorganized, commenced business a few months after the Narragansett Company, or Bristol line, had opened their line to Boston via Bristol, and they were at once brought into open competition, both lines making Providence a competing point. The management of the Stonington line not being controlled by a conservative spirit under such

circumstances, and the administration of the Bristol line not submitting to their opponent's aggressive manner, were soon locking horns, and a war of rates ensued that lasted off and on between the two lines until the latter went to Fall River. The Norwich line did not appear to be so much affected as the principal antagonists in this war. In the summer of 1868, the friction was so great that they had taken the traveling public into consideration by lowering the first-class fare to Boston from New York to \$1.00; to Providence, 50 cents; and meals, 50 cents. This was cheaper and more pleasant to be afloat in the warm weather than to be on shore.

There was then comparative peace between the lines for a few years, but it was only the lull before the storm. The Stonington Company all this time had their eye on the Providence business, that was scattered for the want of having a first-class passenger line at their door, and they took measures to fill the void, though they had a propeller line at this time running to Providence, having but limited passenger accommodations. As soon as this was known to the rival companies, there was considerable thinking done on their part. The Old Colony R. R. Co. was now in control of the Fall River line. Their first move, made early in 1877, was to withdraw from a freight agreement with the other railroads that had been in force for twenty years, and refused to come to any understanding in the matter with either the railroads, or the steamship companies. Their purpose was to prevent the opening of a first-class passenger line to Providence, as the short rail route to Boston makes it a strong competitor with the Fall River line. "To inaugurate and continue a fight until the weakest went to the wall." This was the spirit manifested for a fight to a finish. The new Providence line was opened May 7th, 1877, by the "Rhode Island" and the "Massachusetts." In a few months the Stonington line cut the first-class fare to Boston to \$1.50. The spring of 1878 brought the same relations between the main antagonists, but the Norwich line now became involved and opened a second line, running to Allyn's Point on the Thames River, with the "City of New York" and "City of Boston" for \$1.00, first-class, to Boston, while they run the "City of Lawrence" and the "Falmouth" for local business. The fight was now on in earnest, and the stubbornness

displayed during this contest would have done credit to some former steamboat owners. The next year the Fall River people woke up to the situation, and opened a second line, with the "Newport" and "Old Colony," to Newport, R. I., for \$1.00, first class, to Boston. Each company now had a \$1.00 line to Boston that left the Providence line and Fall River line free in their rates. During the winter of 1879, the propellers were running to Providence again. During the latter part of this year, negotiations were entered into for the withdrawal of the extra lines and restoration of the rates to a reasonable basis, but the principals were not yet ready to sacrifice what advantage they considered they had obtained so far in the war. Mutual friends advised cessation of hostilities, but no, not enough money had been spent, as yet, in the senseless war, so the fight must continue. It continued for a year or so longer, when, after several conferences extending over several months, an agreement was reached at last, in January, 1881, to restore the passenger and freight rates to a fair basis, and the Fall River line and Stonington line to divide the through passenger business accruing to both between them. They fought this out until the stockholders of more than one of the lines considered it was about time to work for dividends, after laboring so long in the interest of the traveling public and freight shippers. So up went the rates. It seems as though neither "went to the wall," and the Providence line was maintained. Taking that view, what did the Fall River line gain? All of the companies were well backed financially, and their operations were ably handled during the contest, else the struggle could not have lasted so long, and have ended with all being on top. It was pitiful to see how some of the large stockholders mourned the loss of their large dividends during the long struggle.

The Fall River Company made a great time of being the only line running "at low fares that affords passengers a full night's rest." While the Stonington line was spreading, "Old Reliable," etc., and the Norwich line was content to cater to the "good supper on the boats at 50 cents."

The Providence and Stonington S. S. Co. had some very severe losses to their vessels by collision, and otherwise. Their motto, at one time, was: "Old Reliable Never Missed a Trip in

Seven Years." Whether such management is a good policy under all conditions for owner and passenger, in which latter include the officers and crew, is a question. There certainly comes a time when to miss a trip shows a regard for life and property. The "Massachusetts," on October 14th, 1877, a few months after being completed, went ashore on the east end of Long Island during a heavy easterly storm, but was finally gotten off in a badly damaged condition, was repaired and in service the next year. Then the "Rhode Island" went ashore near Bonnet Point, in Narragansett Bay, during a thick fog on a trip from New York to Providence, on November 6th, 1880, and proved almost a total loss, only the engine being saved from the wreck. At the time of the loss of the vessel, it was charged that the fog signal at Beaver Tail Point was not in operation. An investigation was made by the proper authority that showed at its conclusion that the fog signal was sounding at the time, and that it was heard several miles away in several directions.

The most serious disaster of them all was the collision on the night of June 11th, 1880, between the "Stonington" and the "Narragansett," sister ships of the line. The "Stonington" was on her trip from Stonington to New York, and when about three miles southwest from Cornfield lightship, and during a dense fog, run into the "Narragansett," that was going in the opposite direction, the latter taking fire and sinking in a short time. Twenty-seven of the passengers and three of the crew are known to have been lost, and it was generally believed that as many more were lost, as the passenger list on the ill-fated vessel was in a highly damaged condition, when found. The licenses of both captains were revoked by the U. S. Steamboat Inspectors after an investigation. It should be remembered that these accidents, or by whatever name they may be called, occurred during the period of the sharp rivalry with the Fall River line. The "Narragansett" was subsequently raised and repaired, and placed in commission on the line. The first time a company took occasion to relieve themselves of all liability outside of the vessel involved in the accident was on that of the ferryboat "Westfield." The accident occurred on July 30, 1871.

In 1882, another wooden hull was built for the company,

at Noank, Conn., of about the same dimensions as the "Rhode Island," of 1873, and the engine from the latter vessel fitted in the new hull, but this time the cylinder of the engine was placed forward of the shaft. The new vessel was named "Rhode Island." This engine was removed in 1890, and a compound beam engine erected in its place, which is now doing duty in the vessel, being built by the Morgan Iron Works, from designs of Henry Leverett and Frederick Sickles, having cylinders 64"x84" and 84" by 144 inches.

In 1889, another wooden hull was built at Noank, Conn., and, when completed, named "Connecticut." The vessel was fitted with an inclined oscillating compound engine, built by William Cramp & Sons S. & E. B. Co. The vessel has not seen as much service as other vessels of the line. Her engine has been thought to be everything but a success, and it is altogether improbable that another of the same type will be built by the company. The "Nashua" and the "Connecticut" would appear to be enough for one company.

In 1892, the single-screw propellers "Maine" and the "New Hampshire" were added to the Stonington line, and to them have fallen most of the Stonington line service since then. They have proved themselves to be serviceable vessels that are well adapted for the business, and of better speed than the earlier side-wheelers on the route, and still afloat. The "New Hampshire" seems to have been the most able of the two vessels. In June, 1896, her average time for 28 trips from dock to dock was 6 hours and 55 minutes. Also June 1st, 1892, made a trip in 6 hours and 34 minutes, and May 24th, 1893, 6 hours and 47 minutes.

The New York and New Haven Steamboat Company opened a new line to Providence in June, 1899, called the Narragansett Bay Line, but as soon as the company came under the control of the New York, New Haven and Hartford R. R. Company, during the following year, the line was withdrawn.

The "Joy Steamship Company" commenced running as a freight line from New York to Providence in September, 1899, with the propeller "Allan Joy," x "Cape Charles," built in 1898, at Chester, Pa., and at the same time they opened a freight line to Boston, Mass., by the outside route, with the "Old Dominion," the side-wheel beam engine steamship form-

erly in the Old Dominion line to Norfolk, Va. They continued this service until March, 1900, except for an interval on the Providence route, when they changed their terminus in New York to the east side of the city, and in June following opened a passenger line with the "Rosalie" x "City of Bridgeport," having in the meantime disposed of the "Allan Joy" to the Bridgeport Steamboat Company. The "Rosalie" having proved too small for their business, they chartered the "Martinique" x "Lincoln," a propeller, built in Bath, Me., in 1897, and this vessel they continued to run until the fall, when they obtained the "Shinnecock," under charter from the Montauk Steamboat Company, that run on the line during the winter and spring of 1901. In the month of April the "Tremont," from the coast of Maine, was then chartered, and shortly after the "Penobscot," from the Boston and Bangor line, was added to form a daily line, the "Tremont" in the meantime having been purchased. In October the "Penobscot" was withdrawn, and the "Virginia," of the Bay line, of Baltimore, Md., having been chartered, was put in her place, and run until June, 1902, when the "City of Key West" x "City of Richmond" was purchased and run with the "Tremont." This vessel proving too slow and unsuitable for the business of the line, the "Cumberland," from Boston, Mass., was purchased in August, 1902, just after her collision in Boston harbor, and renamed "Larchmont."

The company were very unfortunate with their vessels during the summer of 1901. The "Old Dominion" went ashore during a heavy fog on Rye Beach, in Long Island Sound, on July 6, where she remained for nearly one month. The vessel was finally gotten off in a very bad condition and towed to Brooklyn. She was subsequently repaired at a large expense and placed on the outside line again in the following November. The propeller "Cocoa" x "Cuba," built in 1879, took her place in the interval. Then the "Tremont," on July 16, just ten days later, was run into by the steam yacht "Wild Duck," while the former was on a trip from Providence to New York, and near the mouth of the Connecticut River, cutting the vessel almost clean through within twenty feet of the stem, but help being at hand from several of the Sound steamboats, the vessel was beached near New London after

her passengers had been taken off. The vessel was shortly after repaired at Brooklyn and placed on the line again.

This company appears to have made a most able opposition to the "New line" of the Consolidated Company, and with all the ill fortune to their floating stock of a few years ago appear to prosper. They are large freight carriers on both of their lines, and if the "New line" found it profitable to cater to the passenger travel at 50 cents to Providence, the Joy line, with less expensive vessels, more than probable found it so at 75 cents or \$1.00 fare. This low fare scheme seemed at one time as a fixture. It appeared to have developed a class of travel that found it to their business interests to make more frequent trips to and from the terminal cities than when the expenses of a trip were at higher rates. It is found that the class of travel patronizing these very low rates of fare are generally indifferent to the furnishing of the rooms they occupy on board, and for a well-furnished vessel to be placed on such a line is sure to meet with almost the total destruction of the furnishing of the rooms, through ill usage or otherwise, in a single season. It does not pay to run a line at any such rates as prevailed during this opposition, even with the large increase of passengers carried. The regular Providence line suffered in its passenger business during this opposition.

The New York, New Haven and Hartford R. R. Company, through the regular Providence line, gave no concern about the Joy line when it first started, and as long as it remained a freight line exclusively, but as soon as they opened a passenger line the railroad company woke up to the situation, and in July placed the "Massachusetts" on the route as the "New line," with the cut rate passenger fare of \$1.00. This they continued until the "Chester W. Chapin," one of their fine twin-screw propellers, took the place of the "Massachusetts" for the fall and winter months at the lower passenger fare of 75 cents. The "Chapin" met with an accident during a dense fog in March, 1901, by striking on the north side of Patience Island, in Providence River, and sinking in a short time. Before her repairs were completed, the company opened a daily line, in May, with a further reduction in fare to 50 cents, with the "Connecticut" and the "Rhode Island," prepared to drive off all opposition that had begun to assume

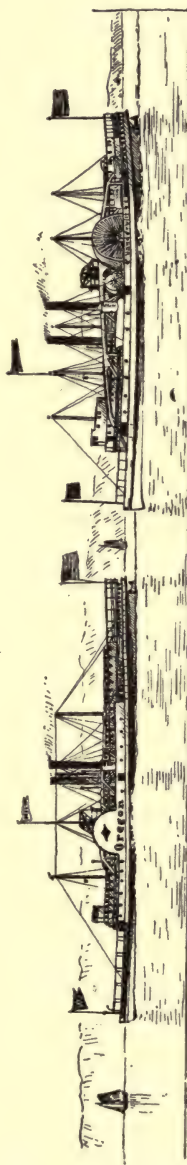
too formidable proportions. The Joy line at this time were maintaining their usual rate of fare to Providence at \$1.00.

The Consolidated Company opened their regular line to Providence in June, 1901, with the "Plymouth" and the "Connecticut," and placed the "Massachusetts" with the "Rhode Island" on the "New line." The regular line boats were withdrawn in November, but the "New line" continued during the fall and winter, and as long as the opposition lasted, to do a large passenger and freight business. The passenger fare had been continued at 50 cents.

In October, 1902, the rival companies came to an agreement, and the "New line" was withdrawn. The Joy line is the only passenger line to Providence outside of the Old line.

On June 1st, 1847, the "Oregon" and the "C. Vanderbilt" had a race on the Hudson River, from off the battery in New York City, to Sing Sing and return, for one thousand dollars a side. The "Oregon" was the property of George Law, and was commanded by Capt. Seth Thayer, while the "C. Vanderbilt" was in charge of her owner, Cornelius Vanderbilt. The latter boat was at this time just from the hands of her builder, not having been placed in commission on the Stonington line. A few minutes before 11 o'clock on the morning named, the "Vanderbilt" appeared off the battery, when the "Oregon" left her dock in the immediate vicinity, and took her position on the port side of the "Vanderbilt," and at four minutes before eleven o'clock, everything being in readiness on board the contesting boats, the signal was given for the start, and both vessels entered on the contest. It was the first of the ebb tide, high water at New York being at 10.16 a. m. The race was entered on with so much spirit, and continued with so much grim determination "to do or die," traits that the owners were both noted for, that the boats were almost bow and bow for about thirty miles, neither one gaining any material advantage. At this point the "Vanderbilt" gained on the "Oregon," the former making 21 revolutions of her engine per minute, and the latter making $19\frac{1}{2}$ revolutions. The "Oregon," realizing that a critical period in the contest had arrived, the power of her engine was increased to 21 and $21\frac{1}{2}$ revolutions, when she gained on the "Vanderbilt," and arrived at the stake boat opposite Sing Sing half a length

ahead, in one hour and thirty-five minutes from the Battery. When passing the "Vanderbilt" the "Oregon" was run into by the former, and her starboard water wheel was much damaged. This is believed to have been caused mainly by the owner of the "Vanderbilt" interfering with the duties of the pilot in the manipulations of the engineer's bells just prior to turning the stake boat, and not from any malicious purpose to damage or hinder the "Oregon." In turning the stake boat the engineer of the "Vanderbilt" made a mistake in answering the bell from the pilot house, and instead of reducing the speed of his engine so as to allow the vessel to turn to better advantage, he stopped the engine entirely, which retarded her progress materially for a few minutes. The "Oregon" had a fair advantage on the beginning of the return, and maintained it throughout the rest of the race, coming to the starting point about a fourth of a mile in advance of the "Vanderbilt." When below Yonkers, her supply of coal was exhausted, and, to keep up the pressure of steam necessary to hold the position she had gained over her adversary, they were forced to tear out the berths in her cabin, take settees, doors, chairs, and everything of a comparatively light and combustible nature, to keep up the pressure of steam in her boilers. It is said that after the race the joiner work of her main deck looked as though a cyclone had struck it. Her pressure of steam was somewhat reduced during this period, but she was so far in advance of the "Vanderbilt" that the latter could not recover the lost ground. On the return both were pushed to their utmost. Each made about 22 revolutions of their engine at times, and carried all the steam they could get. The distance from the Battery to the stake boat and return to the starting point was 66.76 miles, which includes the turning at the stake boat. The "Oregon" made the distance in 3 hours and 15 minutes, against the tide one way and with the tide the other direction, being an average speed of 21.10 miles per hour. This is believed to have been the only race between two steamboats, in which there was a money consideration involved, that has occurred in New York waters. This was before the steamboat law of 1852. Several steamboats, crowded with excursionists, went a considerable distance up the river, following in the wake of the contestants and meeting them again on



RACING OF THE "OREGON" AND "C. VANDERBILT."

the return to the starting point. It was a great day on the water for those of New York City and vicinity. The same day the steamship "Washington" started on her first trip to Bremen from New York.

"Oregon," 1845.—Hull, by Smith & Dimon, of New York, 318'x35'x10'; draft, 6'; one beam engine, by the Novelty Iron Works, 72"x11' stroke, with the shaft forward of the cylinder, in Hudson River style; paddle wheels, 34' diameter by 11' face; two flue boilers on the guards.

"C. Vanderbilt," 1847.—Hull, by Bishop & Simonson, 300'x35'6"x10'3; draft, 8'; one beam engine, by the Allaire Works, 72"x12' feet stroke, with water wheels 35'6 diameter by 9' face.

"Commodore," 1848.—Hull, by Bishop & Simonson, 275'x32'x11', with a beam engine 65" cylinder and 11' stroke, by the Allaire Works.

"Plymouth Rock," 1854.—Hull, by Jeremiah Simonson, 330'x40'x12'8, with a draft of 7'; one beam engine, by the Allaire Works, of 76" cylinder and 12' stroke, with water wheels 37' diameter and 10' face; two flue boilers on guards.

"Bristol" and "Providence," 1867.—Each hull by William H. Webb, and one beam engine and boilers by John Roach, at Etna Iron Works; hull, 360 feet long, 48 feet beam and 16 feet depth of hold; draft of water at launching, forward 4' 8", aft 6' 6"; draft, with all boilers and tanks filled with water, 133 tons of coal, anchors, chains, boats, etc., on board, was, forward, 12' 3", aft, 13' 6"; beam engine, 110" cylinder by 12' stroke, having Sickles adjustable cut off; water wheels, 38' 8" diameter by 12' face; dip, when loaded, 4'; three boilers in the hold, each having double tier of furnaces.

"Electra," "Galatea," "Glaucus" and "Oceanus," 1864.—Single-screw propellers; hulls by J. Van Deusen, foot East Sixteenth street, New York City, each 240'x40'x17', and having two simple condensing engines, with cylinders 44" diameter and 36" stroke, and propeller of 13' diameter and 22' pitch; coal consumption, 20 tons a trip; Etna Iron Works built the engines for the "Electra" and the "Galatea."

The "Metis," "Thetis" and "Doris," were 213'x35'x15'; draft, 11', with simple engine, 50'x40" stroke.

"Narragansett" and "Stonington," 1866.—Each hull by

Jeremiah Simonson, 253'x40'x15'; draft, when loaded, 10'; one beam engine, 62" cylinder and 12' stroke, but few years later a larger cylinder of 72" was substituted. See New York and Philadelphia Outside line.

"Rhode Island," 1873.—Hull by Henry Steers, at Greenpoint, N. Y., 325'x45'6x15'4; loaded draft, 10'. One beam engine, 90" diameter of cylinder and 14' stroke, by Morgan Iron Works, and water wheels, 37'6x12' face.

"Massachusetts," 1877.—Hull, by Henry Steers, 323'8x42'5x15'7; with one beam engine, 90" diameter of cylinder and 14' stroke, by John Roach & Son, at Morgan Iron Works; water wheels, 38'8x12'.

"Rhode Island," 1882.—Hull by Robert Palmer, at Noank, Ct., 332'x46'3x16'4; one beam engine, 90"x14' stroke, from "Rhode Island" of 1873.

"Connecticut," 1889.—Hull by Robert Palmer, of Noank, Ct., 345'x48'x17'3; one inclined oscillating compound engine, 56" and 104" diameter by 11' stroke, by the William Cramp & Son S. & E. B. Co.

"Maine" and "New Hampshire," 1892.—Each hull and the machinery by Harlan & Hollingsworth Co., 302'7x44'x17'5; triple expansion engine, having four cylinders of 28" and 45", and 51" and 51", with a stroke of 42"; propeller, 13½' diameter.

FALL RIVER LINE.

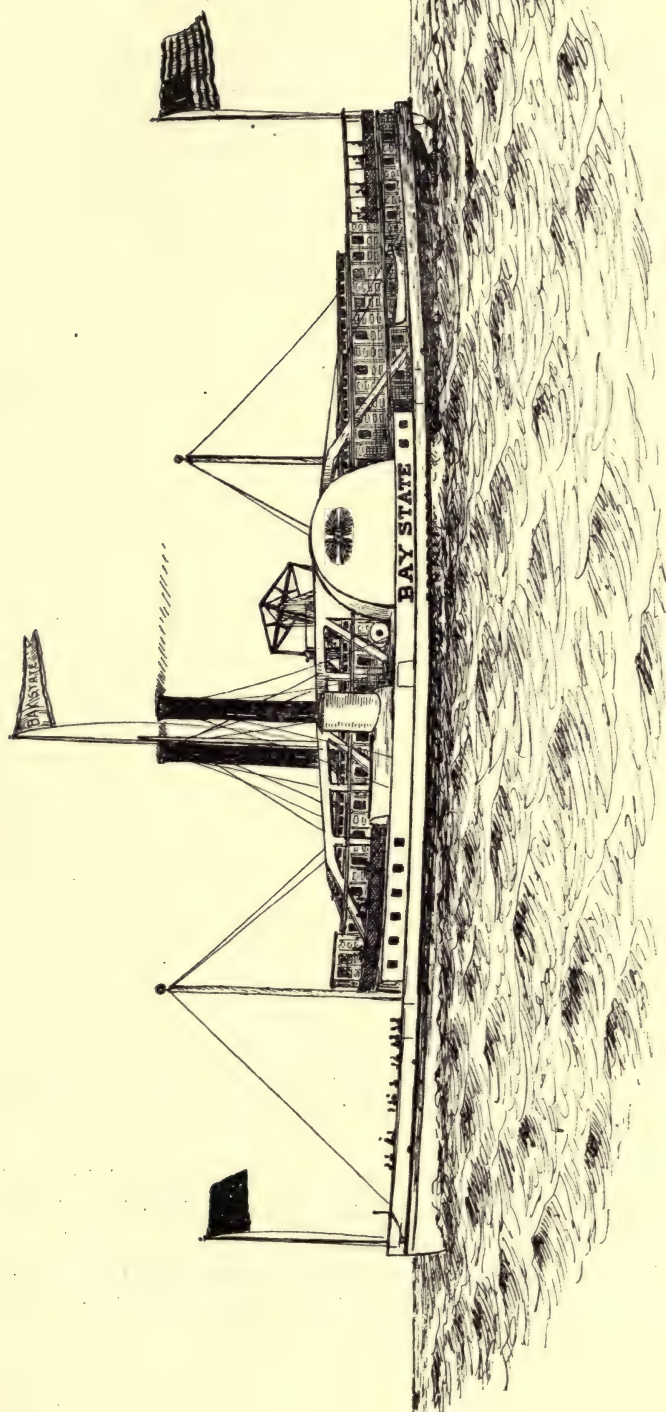
The Fall River line was organized in 1846, by Fall River and Boston capitalists, under the corporate title of the "Bay State Steamboat Company." They commenced business on May 18th, 1847, with the "Bay State" and the "Massachusetts," one of the double-beam engine boats that had been on the Providence line for the Boston and New York Transportation Company, as a chartered vessel. They then made a landing at Newport. They run in connection with the Old Colony R. R., which had been but a few months before opened between Fall River and Boston, thus making a through line between New York and Boston. The Fall River R. R. was opened for business June 9th, 1845, and connected at South Braintree, Mass., with the Old Colony R. R., with which company it was united

in a few years. The steamboat interests were well represented in the board of directors of the railroad company. The board of directors of the steamboat company included Richard Borden, Jefferson Borden, and Nathan Durfee, of Fall River. They had the "Eudora" chartered until the completion of the "Bay State." This was a propeller that had been running to Norwich; her size was 155'x28'x9', with a simple engine, driving a 7' propeller.

The "Bay State" was constructed by Samuel Sneed at New York, and was fitted with a beam engine, built by the Allaire Works. In the next year the "Empire State" was finished by the same builder, and fitted with the same type of engine, and placed on the route as a consort to the "Bay State." These two vessels performed the service of the line until the "Metropolis" was built, in 1854, by the same builder, but her engine was constructed at the Novelty Works, and at the time was the largest marine engine in this country.

Prior to 1854 the "Bay State" was considered the fast boat of the line, and it is doubtful if any steamboat on Long Island Sound could excel her in point of speed until the "Metropolis" was placed in commission, when she was forced to yield the whip to the new boat.

When the "Bay State" made her first trip to Fall River, on May 18th, 1847, the "Oregon," which at that time was but one or two years old and running on the Stonington line, and considered something above the ordinary in speed, was leaving New York on the same night on her regular trip, and after passing beyond the crowded portion of the East River, the two steamboats were prepared for a race through Long Island Sound. It must be remembered at this time there were no lynx-eyed steamboat inspectors on duty prying around the engine room when the boys intended to have "a brush," as that would have been considered an infringement of their rights as American citizens. The boys had not been educated to the higher criticism of inspection at that early day, and would have rebelled at any restriction placed upon them, as they did in part at a later date. The steamboat law was not passed until five years later. It was an open secret for some time that there was to be a test of speed between these two steamboats among those engaged in water transportation around New



"BAY STATE,"

York, and there was considerable speculation and interest taken as to the result. When going through Hell Gate the advantage was in favor of the "Oregon," which lead she increased slightly until the sound was reached, when the "Bay State" was "let go," and in a short time came to the front, and then the business of the hour commenced in full earnest. The "Bay State" maintained the slight lead of about a length all the way through the Sound to about Stratford Shoal Light, and, so there should be no dispute over the matter, the "Bay State" took the north or Connecticut shore side of the "Oregon," and when off Bartlett's Reef, her advantage of position having increased, crossed her bow a safe distance in advance, thus clearly demonstrating her superior speed over the "Oregon." It was without doubt a most determined contest on both sides. The tide was the last of the ebb at Hell Gate. The "Oregon" passed Corlears Hook at 5.18 p. m.; Throggs Point, 6.07; Huntington Light, 7.26; Stratford Shoal Light, 8.18, and arrived at Stonington at 12.07 a. m. The "Bay State" arrived at Newport at 2.15 a. m., making the time from dock to dock in 9 hours and 15 minutes. They evidently had an adverse tide most of the distance through the sound. The owner of the "Oregon" was on board the boat during this trip, and at intervals during the long contest through the Sound would call on the chief engineer and advise him to give her "another peg"—meaning more steam—which the official did as long as it was in his power, for officers of steamboats have no love for being outstripped in a trial of speed by a new boat especially. When nearing the end of the contest the engineer was called on once more to give her "another peg," but the last hole was filled, and he "had no more pegs to give her." She had done her best, and was forced to take second place and see her adversary cross her bow, which is one of the hardest moves to bear on the part of a defeated antagonist, though the distance of clear water between them may be short.

George Law had not been largely interested in marine affairs prior to the building of the "Oregon," but since then had carried a chip on his shoulder, inviting bids to remove it. He first threw the glove down to Cor. Vanderbilt in a tussle, in 1846, between the "Oregon" and the "Traveler," then running

to New Haven, but as the latter had just sold the latter vessel to the New Haven and Hartford R. R. Co., he could not accommodate Mr. Law. The latter was spoiling for a contest, and his wiry hair was standing on ends as he thought there was no equal to his "Oregon." Then he went for the "Atlantic," of the Norwich line, but still he was not satisfied. He was disturbed in his dream by the opening of the Fall River line with the "Bay State." This seemed to stir him, for he issued a challenge to race any or all steamboats having a reputation for speed, and thus settle the question of the fastest steamboat on the inland waters of the Atlantic coast. The "Bay State" had beaten the "Oregon" but a short distance, and it would not do to run the risk of her losing her credit for that race by any match race, so the invitation was declined with compliments. Commodore Vanderbilt issued a card on the subject, in which he said: "This is the first I have heard of the challenge, nor do I believe Mr. Law authorized its issue. The following proposition was made by my brother, J. H. Vanderbilt, on board the 'Bay State,' on Tuesday, the 25th inst., in presence of Mr. Law, Mr. Newton, and Capt. Comstock, to enter the "Hendrick Hudson," the "Bay State," the "Oregon" and "C. Vanderbilt," or any other first-class steamer, for a race to test their speed, the three first-named steamers standing at the head of the list, now in the waters of New York. The proposition was to put in \$500, or any other sum per boat, to run on any named day from the lower bay to Haverstraw Bay and back. This was agreed to by Mr. Law, and partially by Mr. Newton. Captain Comstock wanted until Thursday, it being necessary to see his owners.

"Now, I say, I will run the 'C. Vanderbilt,' untried as she is, against any boat afloat to any place they name where there is sufficient water to float her, for any sum from \$1,000 to \$100,000. This challenge is open until Saturday next, when I propose trying my boat.

"C. Vanderbilt."

This led to the race between the "Oregon" and "C. Vanderbilt," on June 1st, 1847. The "Hendrick Hudson," having same-sized engine as the "Oregon," and about thirty feet larger in the length of her hull, would have been outclassed in the proposed race. A little later the "Oregon" was taken to the

Hudson River for service, and occasionally was brought in the full glare of publicity through a challenge for a race by her owner. The vessel was at a later date disposed of by her original owner, as he was then largely interested in the coast-wise trade to the Isthmus of Panama.

The "State of Maine" was run as a day boat to Newport, R. I., from New York, at 8 a. m., and from Newport at 7 a. m., on alternate days, from July 19th, 1853, to September 14th following.

The "Metropolis" was a very heavily built boat, and of a medium full model. She made some very fast trips, that are thought by some to be equal to any made on Long Island Sound, but figures on another page do not uphold that opinion. She was a very fast one, no doubt, but there have been more speedy steamboats since then on Long Island Sound. When the vessel was under way, the disturbance in the water through which she was passing was such as to give the appearance of her pushing the whole body of water before her. It was not an easy model to drive, and it was only the great power of her engine that gave her the speed she developed. As this vessel was a radical departure in construction at the time from all river and Sound steamboats, a few details may be of interest regarding her.

Length on deck, 342 feet; length of keel, 325 feet; breadth of beam, 45 feet; depth of hold, 16 feet; draft of water, average load, 10 feet 6 inches; floor timbers and frames double moulded, at keel, 20 inches; sided, 20 inches; at top, moulded, 8 inches, and sided, 16 inches; between centres, 24 inches; of white oak, live oak and locust; seven keelsons of white oak, centre of 4 feet in depth, outer keelsons of 3 feet each; engine keelsons, $6\frac{1}{2}$ feet deep; top timbers extended to state-room deck, 10 feet above main deck; frames were strapped diagonally with iron bars, $4\frac{3}{4}$ "x $\frac{3}{4}$ ", on the same plan as the Collins steamships, extending to the state-room deck. This made it unnecessary to make use of the "hog frame."

The beam engine was built by the Novelty Iron Works, with a cylinder of 105 inches diameter by 12 feet stroke, and fitted with a Wells & Allen cut off. There



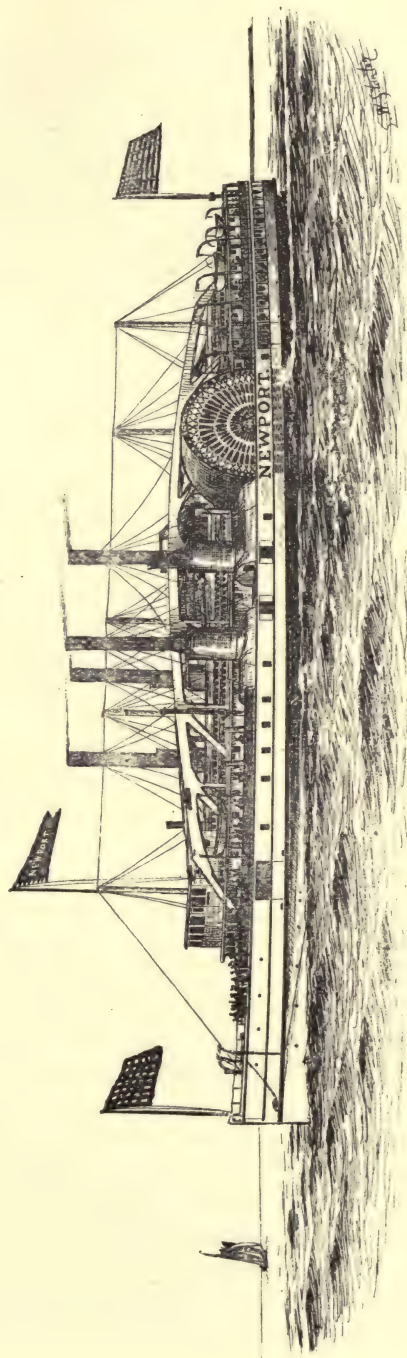
were four vertical tubular boilers, two on either guard, set back to back with one smoke chimney to two boilers. These boilers were of the same general design as in the Collins steamships. They were expensive boilers to keep in repair, and were removed in 1860. The average pressure of steam was 22 to 25 pounds, cutting off at from $3\frac{1}{2}$ feet to 5 feet, with $14\frac{1}{2}$ to $15\frac{1}{2}$ revolutions per minute. Consumption of coal, anthracite, 40 to 60 tons per trip; water wheels of iron, 41 feet diameter, with 32 buckets in each wheel, 13 feet long.

The extension of the joiner work to enclose the forward main deck to the stem was in all probability first used along the Atlantic coast on the "Metropolis," and then on the "Commonwealth."

The average running time of the "Metropolis," when new, was 10 hours, consuming 44 tons of coal when running her blowers, and with natural draft only in 11 hours and 34 tons of coal. The average running time, at this same period, of the "Bay State" and the "Empire State," was 11 hours, and consuming 44 tons of coal per trip, and operating under a steam pressure of 30 lbs. to 45 lbs. per square inch, according to circumstances.

After the "Newport" and the "Old Colony" were added to the line, in 1865, the "Metropolis" was withdrawn for a time from further service, and some years later was broken up at Boston.

In 1863 a change took place in the controlling interest of the Bay State Steamboat Company, it passing to Boston and Newport parties. It was reorganized on June 8th, 1863, as the "Boston, Newport and New York Steamboat Company," at Newport, R. I., with a capital stock of \$650,000. The first Board of Directors were E. S. Tobey, John R. Brewer, James L. Little, Benj. E. Bates, and James H. Beal, of Boston, Mass.; Alex. Holmes, of Kingston, Mass.; Benj. Finch and Rufus B. Kinsley, of Newport, R. I., and Nathan Durfee, of Fall River, Mass. Four hundred and eighty-four thousand dollars of the capital stock of the company at this time was owned by Boston people. So the company was now controlled by Boston interests. They soon started in to build a new fleet for the line. In 1864 they had a wooden hull propeller built at



"NEWPORT."

Medford, Mass., designed especially for freight, named "Fall River," of 600 tons, but on account of her limited freight capacity, with the habit of violently pitching in a head sea, due to her sharp lines fore and aft, she proved a grand failure, and was broken up in 1880. In 1865 the "Old Colony" was built at New York and fitted with the engine from the "Bay State," with a new cylinder 4 inches larger than the old one. In the same year the "Newport" was also added to the line, with the expectation of high speed. The best time to her credit, of which there is any record, is a run of 60 miles in 3 hours during her first year. Her guards were narrower than usually found on vessels of her class, and on her guards were four boilers, two on each side, with four smoke chimneys. After a few years' service she was "sponsoned" to give her more stability, as originally she would roll down under a very slight provocation. It was thought by many whose opinions were entitled to some consideration on the subject that the "Newport," on account of her lighter weight of hull and upper works and easier model to drive, was a more speedy boat than the "Metropolis." If so, there appears no record of such being the case. The new management made a new departure in 1864, by placing the "Empire State" on a day line, both ways, from Newport, but continued that service only about a week, as it was not well patronized by the traveling public.

In 1869, the "Narragansett Steamship Company," which had purchased the "Bristol" and the "Providence," after the failure of the "Merchants' Steamship Company," and had run them to Bristol, R. I., in opposition to the Stonington line and the Fall River line for two years, during which time there was a cutting of passenger fare to as low a figure as one dollar to Boston and 50 cents to Providence, first class, consolidated with the Boston, Newport and New York Steamboat Co., under the name of the "Narragansett Steamship Company," and withdrew the Bristol line by agreement with the Stonington Company. This was Fisk and Gould in control. It was run under this name until some time after the death of James Fisk, Jr., in 1874, who was the leading spirit of the enterprise, when the "Old Colony Steamboat Company," or the original interests in the line, purchased the entire property of the company through the Old Colony R. R. Company, since which time the line has done a steadily increasing business.

From the time of the control of the Fall River line by the Narragansett S. S. Co., in 1869, until the latter company closed out their interest, there was a sharp competition for the business of the sound lines, and especially between the Stonington line and Fall River line. There were not many rate wars, but there were increased accommodations for the traveling public, large amounts spent on the decorations of the vessels, and everything done to attract travel. The Fall River line got their full share of the increased business.

The "Bristol" and the "Providence" were built in 1866 by William H. Webb, of New York, in a very substantial manner by day's work, and nothing was omitted which money could procure to make them in every respect the finest specimens of marine architecture of their day. The engine of each vessel was the largest engine of its type in any steam vessel at the time, and were constructed by John Roach at the Etna Iron Works from designs by Erastus W. Smith, engineer, of New York. Each vessel had 240 state rooms and over 300 berths in all for the accommodation of passengers, and were able to care for 840 passengers with comfortable sleeping quarters on a trip. Their freight capacity was placed at 40 freight cars each.

In 1879 the company commenced to run two of their boats to Newport in summer and early fall, at the same time running two boats to Fall River, though this had been done under the Narragansett Company's administration also.

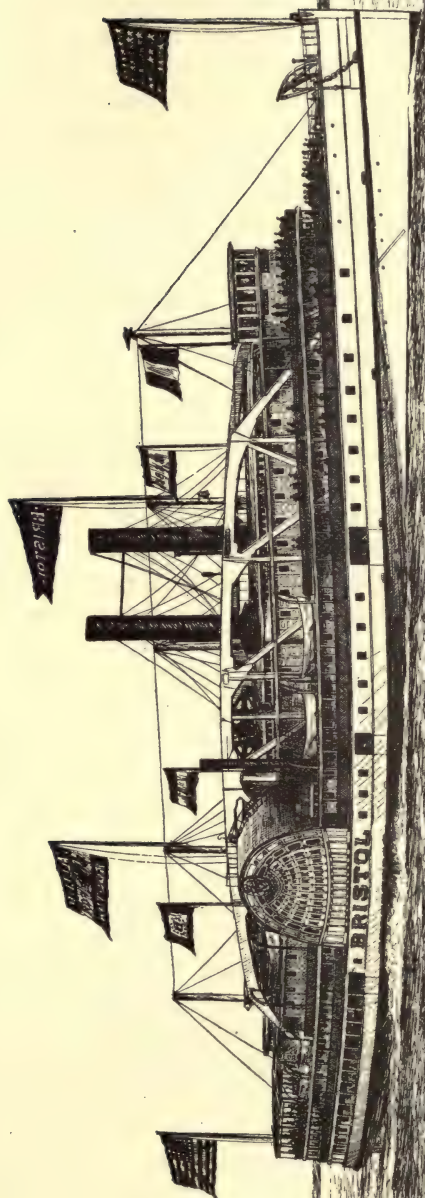
In 1883, the company added to their fleet their first iron-hull vessel, the "Pilgrim." This was the first of the modern vessels. It was built by the Delaware River Iron Shipbuilding and Engine Works, at Chester, Pa. The hull of this vessel was built with an inner and outer skin on the bottom, connected together by a system of transverse and longitudinal bracing. The whole of the engine-room space on the main deck is enclosed by plate iron bulkheads, even the door of the engine room. The vessel has passenger accommodations for about 675 passengers. The engine of this vessel is the largest simple-beam engine that has been constructed for marine purposes. The consumption of fuel for the first season she run averaged 85 tons a trip, but the size of the furnaces of her boilers having

been reduced by bricking up, there was a reduction in her coal consumption in the boilers to 75 to 80 tons a trip. New boilers were built for the vessel in 1901. The vessel has been a good investment for the company, having paid for herself some years ago in her earnings. There is one thing that has marred the beauty of this vessel, and that is the low free board, or nearness of her guards at the water wheels to the surface of the water. The vessel was originally intended to be about 25 feet longer than built, but previous to construction it was decided to make the vessel that much shorter, as it was feared that she could not be readily handled in the crowded parts of the rivers around New York, on account of the extreme length. The 25 feet was taken out of the midship section, the most buoyant part of the vessel. This accounts mainly for her setting so low in the water, with probably an error in the original estimate of her displacement.

In 1882, there was built at Chelsea, Mass., the "City of Fall River," as a freight boat exclusively. This vessel was fitted with a compound beam engine, built by the W. & A. Fletcher Co., and was the subject of several tests to ascertain the economy in a compound beam engine over a simple condensing beam engine in a vessel. Her performances have been very satisfactory to the company, being a large carrier as well as very economical in fuel consumption. A few years later two similar vessels were built, the "City of Brockton" and the "City of Taunton," each having similar type of engine to the "City of Fall River."

The "Empire State" had been disposed of prior to 1880, and had been used in the excursion business at various cities along the coast, until destroyed by fire while lying at Bristol, R. I., on May 5th, 1887, belonging to parties at that time at Taunton, Mass. The "Metropolis," in 1879, was purchased by James Powers & Co., of Boston, Mass., who broke up the vessel for the old metal, and machinery for the scrap heap. The "Bristol" was destroyed by fire while lying up at Newport, R. I., on December 30th, 1888. The "Providence" was broken up at Boston, in the fall of 1901, for the old metal.

The "Pilgrim" and the "Providence" formed the line to Fall River after the building of the former vessel, while the "Newport" and the "Old Colony" were running to Newport dur-



"BRISTOL."

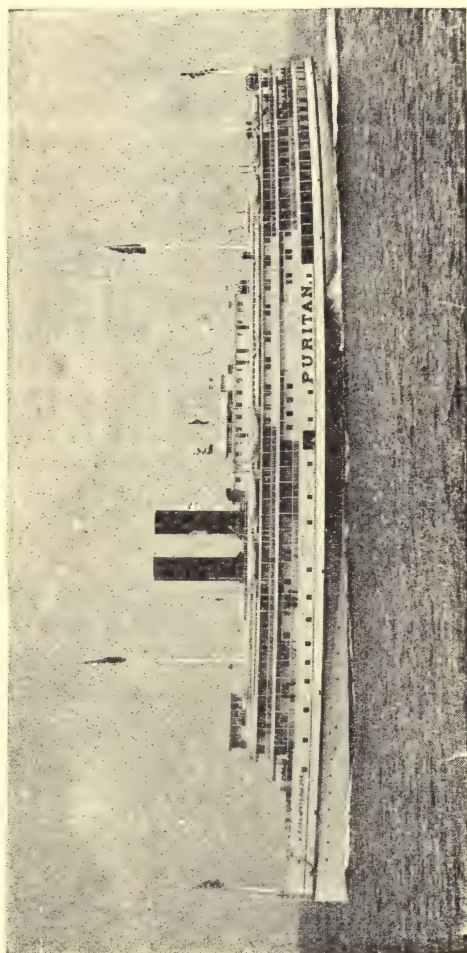
ing a portion of the year, until the "Puritan" was constructed, in 1889. The hull of this vessel is about 20 feet longer than the "Pilgrim," with an increased depth of hold of about 3 feet. There was a radical departure in the type of engine for so large a passenger steamboat. She has proved herself a most excellent sea boat in heavy weather. While the "Puritan" has not made the best time on the Sound, still she is a very speedy vessel. When she was a few years in commission, and the "Richard Peck," a new boat on the New Haven line, there were a few short trials of speed between them, but nothing resulted to show a marked superiority of one over the other, although the figures under "High Speed" show the "Puritan" to the best advantage.

Following the "Puritan" came the "Plymouth," built in 1890, with a hull 20 feet shorter than the "Pilgrim," and of the same depth of hold as the "Puritan." The motive power was another departure in type, being in this vessel a double-inclined triple expansion engine. While this vessel has at times made fast time for comparatively short distances in the Sound, still she is not so regular on that point as some other steamboats on the line.

The last and largest of the fleet, the "Priscilla," was added to the line in 1894. The hull is 50 feet longer than the "Pilgrim," and 22 feet longer than the "Puritan," and fitted with double-inclined compound engine of greater power than any of the other vessels of the fleet. She has made only one through trip in fast time of which there is any record, and that is one of the best made.

The decorations of the saloons, the furniture, and all the interior fittings of the present fleet are up to date. The line certainly has been extremely fortunate for many years in having no serious accidents where loss of life was involved. The only line on the Sound that was really unfortunate, if it may be put that way, of late years, was the Stonington line prior to 1880.

Will the marked incentive to progress in the character of the vessels, accommodations, etc., that was so manifest when the competition was sharp between the individual companies, become dormant since all the water transportation of the Sound is under one controlling interest, with one exception?



"PURITAN."

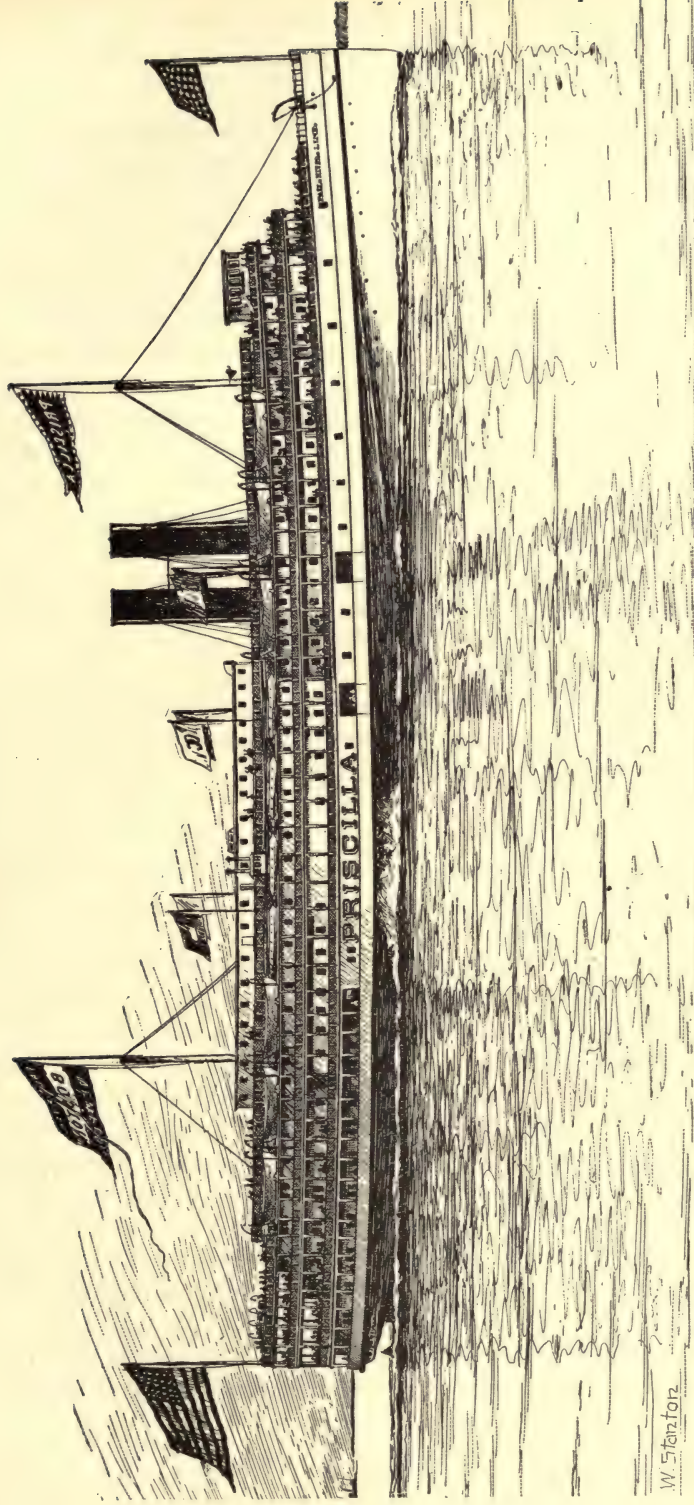
And as there is no longer the same spirit of business rivalry to keep in advance of competitors as there was when the different lines were controlled by the individual companies, it is fair to suppose there will not be any fast time made by the new steamboats as formerly, while the present conditions control the situation.

The initial steps towards the absorption of the principal water lines of the Sound by the N. Y., N. H. & H. R. R. Co. were taken about 1885, and its consummation to all appearances deferred until the New York and New England R. R. apple fell from the tree. The Old Colony R. R. was leased to the N. Y., N. H. & H. R. R. Co. for 99 years, from March 1st, 1893, they assuming to pay all liabilities of the former company, and agreeing to pay as rental 7 per cent. a year on the capital stock. The New York, Providence & Boston R. R. Co. was merged by exchange of stock with the N. Y., N. H. & H. R. R. Co., share for share, on February 13th, 1893. This took in the two steamboat lines. The New York and New England R. R. was leased for 99 years, from July 1st, 1898, the N. Y., N. H. & H. R. R. Co. assuming all obligations of the former company, and guaranteeing dividends of 3 per cent. per annum on preferred stock of the company. This included the N. Y. and New London Steamboat Company.

The steamboat lines have proved a good investment for the railroad company in one way at least, and that has been in case of the latter being blocked in the transaction of their business from any cause, they are able to transfer their freight and passengers by their steamboat lines that are not subject to any other influence or control.

Will any of the passenger steamboat lines be closed up in the near future as passenger lines by the Consolidated Company, as follows the practice in the creation of trusts with the more unprofitable plants?

The Consolidated Company—by this is intended the N. Y., N. H. & H. R. R. Co. and Sound lines—was very unfortunate in 1902 with their vessels, more so than at any other period, commencing with the "Pilgrim," in May, in wrecking the main portion of her engine, followed a few weeks later by the "City of Brockton," with a more complete destruction of her engine, and a few weeks later by the "Massachusetts" breaking



"PRISCILLA," OF FALL RIVER LINE.

W. Stanton

her working beam, that had not been the most secure for a long time, and then, in July, the collision of the "Priscilla" with the steamship "Powhattan," off Brenton Reef Light Ship, during a thick fog, and the former's withdrawal during the height of the busy season for a few weeks for repairs. The Stonington passenger service was closed just after the "Priscilla" collision, made necessary by the shifting of the boats on account of the withdrawals for repairs, but opened again in August or September.

Three beam engines belonging to the same company, and all meeting with serious disaster to property within a few weeks, is certainly making a record. The only similar case that can be brought to mind, though not as great in extent, was that of the two large towboats, the "C. Vanderbilt" and the "Connecticut," when running on the Hudson River. The former broke the strap of her working beam, on June 5th, 1879, and the "Connecticut" followed suit on June 12th, 1879. Considerable damage was done in both instances. Belonged to one company. There were six passenger steamboats on the Hudson River that met with serious trouble from the breaking of their working beams from 1844 to 1854. They were the "Albany," "Knickerbocker," "Niagara," "North America," "Troy," and "Washington."

"Bay State," 1846.—Hull, by Samuel Sneed, 300'x39'x13'2; beam engine, by Allaire Works, 76" cylinder by 12' stroke; water wheels, 38'x10'3.

"Empire State," 1847.—Hull, by Samuel Sneed, 304'x39'x13'6; beam engine, by Allaire Works, 76" cylinder by 12' stroke; water wheels, 38'x10'3.

"Newport," 1865.—Hull, by John Englis & Son, 331'x43'3x14'2; beam engine, by Novelty Iron Works, 85" cylinder by 12' stroke.

"Old Colony," 1865.—Hull, by John Englis & Son, 310'x42'x14'; beam engine from "Bay State," with larger cylinder, 80"x12' stroke; water wheels, 36' diameter.

"Pilgrim," 1882.—Hull and machinery by Delaware River I. S. B. & E. Works, 372'x50'x15'6; beam engine, 110"x14' stroke.

"Puritan," 1889.—Hull, Delaware River I. S. B. & E. Wks., 403'x52'6x18'; compound beam engine, by W. & A. Fletcher

Co., having cylinders 75"x9' stroke, and 110"x14' stroke; water wheels, with feathering buckets, 35' diameter by 14' face.

"Plymouth," 1890.—Hull, Delaware River I. S. B. & E. Works, 352'x50'4x18'8; double-inclined triple expansion engine, with cylinders 47" and 75" and 81½" and 81½" by 99" stroke, by W. & A. Fletcher Co.

"Priscilla," 1894.—Hull, Delaware River I. S. B. & E. Works, 425'8x52'3x18'3; double-inclined compound engine, by W. & A. Fletcher Co., having two H. P. cylinders, each 51" diameter, and two L. P. cylinders, 95" diameter with 11' stroke; water wheels, feathering buckets, 35'x14'.

NEW LONDON AND NORWICH, CONN.

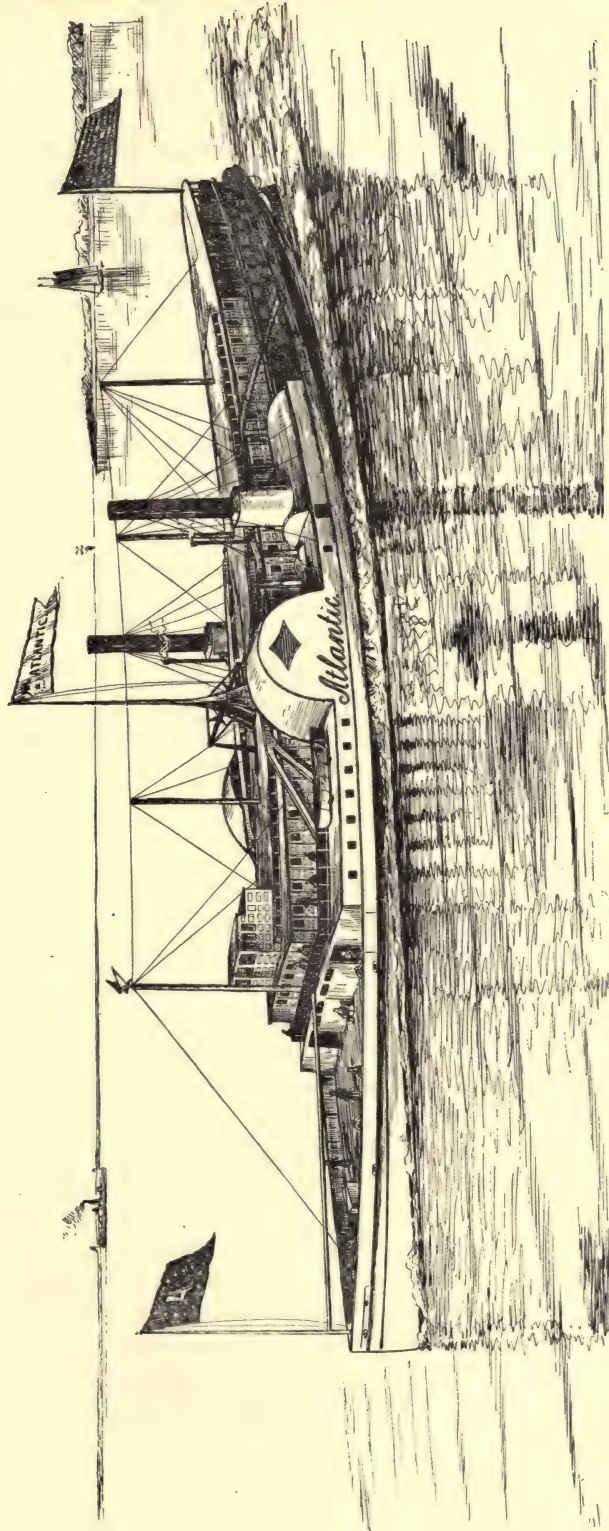
A The first steamboat to run to New London and Norwich was the "Fulton," in March, 1818, which run between New Haven and New London and Norwich, connecting at the former place with the "Connecticut" that run from New Haven to New York, the two forming a through line between Norwich and New York. There was a small boat built at Norwich in 1817, by Gilbert Brewster, of that place, that he named the "John Hancock," and that had a small engine and a wooden boiler. During this year President Munroe visited this section of the country, and about the time of his expected arrival at New London this boat made an excursion with about fifty persons from Norwich to New London, and when approaching the latter place the back end of the boiler blew out, but by a very fortunate circumstance, all the passengers being in the forward part of the vessel, but one of the hands was slightly scalded.

B About 1832, the "Flushing," a boat of 98 feet long, and owned by Jonathan Peck, was placed on the route between Norwich and New York. She had a square engine, as did most of the eastern steamboats at this date. The "Henry Eckford," that had been on the Hudson River, and was fitted with one of the early compound engines by James P. Allaire, also run on the route for a time, under command of Capt. Davison; also the "General Jackson," that was a smaller boat, and had been on the Hudson River, was for a short time, in 1835, also on the route to New York.

XThe "Norwich," built in 1836, by Lawrence & Sneed, of New York, for the New London and Norwich Steamboat Co., was run between Norwich and New York for several years, under the command of Capt. W. W. CoitX

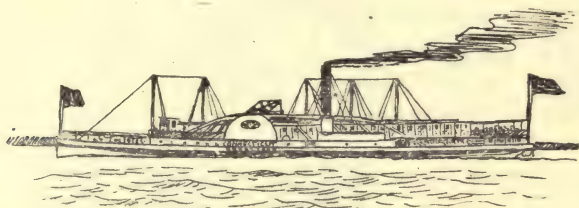
There was evidently a very sharp competition on this route from 1840 to 1842 at frequent intervals, as Capt. Sanford had the "Charter Oak," while Cornelius Vanderbilt was running the "Cleopatra," and later the "Worcester," that was a new boat, in 1842. When Vanderbilt and Sanford came into control of the lines further west on the Sound, they formed a combination for the control of the Norwich business, taking in the "Norwich" at the same time, and connecting with the Norwich and Worcester R. R. This continued until late in 1842. The railroad from Norwich was opened to Worcester in March, 1840, and extended to Allyn's Point, seven miles below Norwich, on the Thames River, in 1843. Vanderbilt appears to have had the only connection with the railroad from 1843, running as the N. Y. and Boston R. R. line up to 1848, when Daniel Drew had the "Knickerbocker" and Vanderbilt the "Worcester," which continued under the name of the Norwich and New London Steamboat Co.

In 1846 the "Atlantic" was built by Bishop & Simonson, of New York, and placed on the route the same year by the Norwich & N. L. S. B. Co., and was the first of the Sound steamboats to use gas for illuminating purposes that was made on board. This was a very able boat, but her career was short, for on November 25th of that year, after being in service but a few months, she was lost on the rocks off Fisher's Island, the primary cause being the breaking of the main steam pipe, leaving her helpless in a heavy sea, during a violent northwest gale just after leaving New London harbor. Capt. Dustan, her commander, and about thirty persons, met a watery grave. While this steamboat was running to the Thames River the "Oregon" was on the Stonington line, and the two vessels had several trials of speed, but they were very evenly matched, being very near the same size vessels, with the same power of their engines. After the owner of the "Oregon" found there were other fast steamboats than those he owned, he issued one of his characteristic challenges September 3d, 1846, in these words: "The friends of the 'Atlantic' have claimed that she



"ATLANTIC."

was faster than the 'Oregon,' and that they were ready to back their opinion, and that if I offered a bet it would be taken up before it was dry. For the purpose of testing their statements and their confidence in the speed of the 'Atlantic,' I now offer to back the 'Oregon' against the 'Atlantic' to run from New York to the Lightboat at Stratford for \$5,000, to be run any day this week, two days' notice to be given, and the money deposited if this notice should be accepted. I will then show the public that I have kept my promise never to allow the 'Oregon' to race on her regular trips to Stonington." The offer was accepted to run during the month of December without passengers, but as the 'Atlantic' was lost prior to the date set for the race, the bet was canceled.



"CONNECTICUT."

The "Knickerbocker" and the "Worcester" continued the service, with occasionally the "Cleopatra," until 1855, when there was a change in the affairs of the company, the "Connecticut" and the "Commonwealth" being placed on the route, the latter on April 5th, 1855, where they continued until withdrawn from the service, as an agreement could not be arrived at with the railroad company as to the percentage of receipts from the through travel. H. B. Norton was president of the company at the time of building of the "Commonwealth." She was considered to be one of the most beautiful of the Sound boats of her day, though not possessed of high speed. These early boats run mainly to Allyn's Point until 1860.

Long Island Sound was frozen over in the winter of 1856 and 1857 to such an extent as to close navigation entirely. The ice was solid at Sand's Point, so that communication on foot or by sleigh could be made with safety from shore to shore. There was no intercourse through the Sound, or arrivals at New York

through Hell Gate, from January 17th to February 24th, 1857, a space of 38 days, something that has not occurred since those dates. The ice was so heavy and the floes so large that the light ships located at Bartlett's Reef, Cornfield Reef, and Stratford Shoal were removed from their stations, for they could not hold fast to their proper positions, on January 27th, and not returned until March 7th following, a period of 39 days. Some of the light vessels further east in the Sound were removed also for a time. That was a winter of extreme low temperature and many heavy snow storms in this latitude. There was an ice blockade from Sands Point to Hell Gate for a few days in January, 1867, that closed water communication with New York by the way of Long Island Sound. It was at this time that an ice bridge formed for a few hours on January 17th, and also on the 23d, between New York and Brooklyn, and a large number of people, on both days, took advantage of the condition to walk across the river on the ice, and, on the 25th, several adventurous persons crossed the Hudson River at 42d street, New York. In February, 1875, all water communication was closed for about ten days through Hell Gate to Sands Point, and four of the large Sound boats were locked in the ice at the latter point for about four days. During four days of this period the Fall River line sent the "Old Colony" and the "Newport," and the Stonington line the "Stonington" by way of Sandy Hook and the east end of Long Island, having a Sandy Hook pilot on board. The companies were then advised by the supervising steamboat inspector, of New York, that their certificates for the vessels did not permit of their sailing by the way of Sandy Hook, and that put a stop to that route being used in the emergency. There were comparatively few passengers, but a large amount of freight had accumulated at both terminals for transfer. The Sound was open in less than a week later. In the winter of 1852, there was an ice blockade for a few days.

The succeeding company was the Norwich & New York Transportation Company that was organized in 1860, and promoted through the influence of Capt. Joseph Comstock, with the Norwich & Worcester R. R. Co., having a large interest in the company, with some New York capitalists. In 1860, they had built for them by Samuel Sneed, at Greenpoint, L. I.,



“CITY OF NEW YORK.”

two steamboats, the "City of Boston" and the "City of New York," and the machinery constructed by the Novelty Iron Works from designs by Charles W. Copeland, engineer. These boats were built for fast passenger service for the through travel to the East, and, when new, there were probably none of the Long Island Sound boats that were able to excel them in speed, unless it was the "Newport," of the Fall River line, that had a much larger engine, and it was only under abnormal conditions the latter could have done it, if at all.

Some time after the "City of Boston" was placed on the route, the "Metropolis" and the former had a "brush" as far as off New London, with the odds in favor of the "Boston." With this result, those in the interest of the "Metropolis" were not satisfied, as it was attributed to poor coal under the boilers. That was, and is still to this day, an old "stand-by" in case of defeat. Not long after having been supplied with a stock of selected coal, the friends of the "City of Boston" were given to understand from a quarter that admitted of no doubt of the Fall River people's desire for another race, and that they did not think that the former brush could be repeated with the same result. So, on an appointed day set for the trial, both started out from New York on their regular hour, and kept close together until well into the Sound, and it was nip and tuck, or anybody's race for several miles. After they had got well to the eastward, it was found necessary to "slow down" the "Metropolis," as the strain put upon the engine was more than it should bear, and prudence dictated that course, as found later. The "City of Boston," of course, was the victor. That was the last time the "Metropolis" was put under the whip.

The "City of Boston" again showed that she was not to be trifled with by the large Sound boats. On July 4, 1865, on her trip out of New York with but a small freight list and but few passengers, left her dock without a thought on the part of her officers to break the record until she was about off Sands Point, when it was found that they had then made very good time to that point, and from that lighthouse they set to work to see what time they could make to New London. It must be here remembered that every condition was in her favor, as in all cases where steamboats make fast runs, no heavy head

winds, or no head winds at all, favorable tides and light loads. See under head of "High Speed."

In 1862, the company added to the line the "City of Norwich" and the "City of New London," both of which were constructed at New York. They were smaller than the two other boats of the company and were used for freight and passengers, more especially for the former, and were run from the Norwich end of the route, while the "City of New York" and the "City of Boston" were run from New London. On April 18th, 1866, the "City of Norwich" was run into by schooner "General S. Van Vliet" when off Huntington harbor, took fire and sunk, by which eleven lives were lost. She was afterwards raised and repaired and placed on the route. In 1894, she was sold and broken up.

In 1867, the company had built for them by the Harlan & Hollingsworth Company, at Wilmington, Del., their first iron-hull steamboat, the "City of Lawrence."

She was designed more for a freight boat, but has large passenger accommodations for a vessel of her size. She was mainly employed on the Norwich route for many years, and proved a very good and serviceable vessel for the company. On November 22d, 1871, the "City of New London" was totally destroyed by fire while on the Thames River, about three miles below Norwich, by which seventeen of the passengers and crew were drowned.

In 1881, the company added to the line another vessel built for them by Harlan & Hollingsworth Company, named the "City of Worcester." This vessel is also of iron, and was the first of the large passenger boats on the Sound with an iron hull. She is of 2,485 tons, and is licensed to carry 742 passengers. There are 193 staterooms and 164 berths, exclusive of those for the use of the officers and crew of the vessel. Since she has been on the route, in November, 1881, the vessel has proved a very stiff and able vessel in heavy weather. There was an innovation made in the planning of this vessel upon all previous designs of Sound boats, and that was in having a separate gangway for passengers from the freight gangway aft of the water wheels, whereby the passengers may pass to and fro from the pier to the vessel without being inconvenienced by the passing of trucks loaded with freight.

At the time of the "City of Worcester's" entry on the New London line, in 1881, the "Massachusetts," of the Providence line, was, in all probability, one of the ablest of the Long Island Sound boats. During the spring of the following year, there were a few trials of speed between these two boats, first one and then the other gaining an advantage, until the night of July 4th, 1882, when they had a decisive trial from New York to the east end of the Sound, it ending with the "City of Worcester" making better time by 23 minutes than the "Massachusetts," which settled the question of superiority between these two boats. Average steam carried by the "City of Worcester" this night was 35 pounds, with $18\frac{1}{2}$ average revolutions of her wheels, with maximum revolutions during one hour, 1,169. Time from dock to dock, 6 hours and 52 minutes. Tide not favorable; wind from the east (head wind) blowing strong. The next summer the "Pilgrim" was brought out for the Fall River line, and as these two vessels were on the same nights running in the same direction, they were soon seeking a close companionship. On the 28th of August, they had a friendly test of speed, resulting in the "City of Worcester" beating the "Pilgrim" from off Bartlett's Reef light vessel to Throggs Point, 13 minutes. Then, on September 29th, they tried it again to Bartlett's Reef light vessel, and the "City of Worcester" beat her again by 8 minutes. These trials of late years are all made within the limit set by the law, and rules and regulations of the steamboat inspectors. The "City of Worcester's" best time was made on June 27th, 1882, from dock to dock, in 6 hours and 20 minutes, leaving New York at P. M. High water at Governor's Island, 5.05 P. M.; Hell Gate, 6.54 P. M. There was an error made in the location of parts of machinery in the vessel and added over original weights, that has caused the vessel to set about 15 inches by the head when loaded.

In 1894, the "City of Lowell" was built at Bath, Me., by the Bath Iron Works, for the line. This vessel has proved herself to be a good staunch vessel, with sufficient power to hold her own with the ablest of the Sound steamers. Her best time was made in October, 1894, and her performances have been of too recent date to make any further extended mention of than is contained under heading of "High Speed."

There have been no steamboats running to Norwich since 1895 or 1896.

"The City of Boston" and the "City of New York" were taken to the Bone Yard, at Boston, Mass., about 1896, and broken up.

In 1844, there were two propellers running to Norwich from New York, carrying passengers and freight, named the "Shetucket" and the "Quinnebaug," they being 120'x20'x7'8, and, in 1845, the "Decatur," and, in 1852, the "Charles Osgood," the two latter being longer and about four feet deeper in the hold. They run here for several years. In September, 1844, there was a race from New York of three propellers then running to Norwich—the "Eudora," that subsequently was temporarily on the Fall River line, "the Uncas," and the "Quinnebaug." This was at the time of the rivalry of the inventors of the different types of screw propellers that were just coming into use, the most prominent being the Ericsson and the Loper wheel. The "Eudora" and the "Uncas" were fitted with the Ericsson wheel, while the "Quinnebaug" had the Loper wheel. They had a head tide most of the distance, with a fresh head wind. The "Eudora" left New York at 4 P. M., the "Uncas" at 4.18 P. M., and the "Quinnebaug" at 4.31 P. M. The latter passed the "Uncas" in the East River at 5.04, and the "Eudora" at Throggs Point, at 6.15 P. M., and arrived at New London the next morning at 7.50. Several of these propellers lasted long enough to get charters as transports during the War of the Rebellion, in some cases for a year or more at a time, at from \$115 to \$150 a day. Six or eight months' charter was more than any one of them were worth at the time.

"Cleopatra," 1836.—Hull, Bishop & Simonson, 193'x23'x 8'11; beam engine, by West Point Foundry, 44"x11' stroke; water wheels, 23'x11'6.

"Knickerbocker," 1843.—Hull, by Smith & Dimon, 291'6x 31'6x9'6; beam engine, from steamboat "DeWitt Clinton," having cylinder 65"x10'.

"Worcester," 1841.—Hull, Bishop & Simonson, 219'x28'6x 10'; beam engine of 48"x11'.

"Atlantic," 1846.—Hull, Bishop & Simonson, 320'x36'x 9'10; beam engine, 72"x11' stroke; water wheels, 36'x9' face.

"Commonwealth," 1855.—Hull, Lawrence & Foulks, 316'x 41'6"x13'x8'3" draft; beam engine, by Morgan Iron Works, 76"x 12'; water wheels, 38' diameter by 10'6.

"City of Boston," 1860.—Hull, by Samuel Sneed, 301'x 40'x12'3"; beam engine, by Novelty Iron Works, 80"x12' stroke; water wheels, 37'8"x10'6"; two return tubular boilers on the guards; consumption anthracite coal per hour, with blowers, 2¾ tons.

"City of New London," 1863.—Hull, by John Englis & Son, 219'x36'x12'4"; beam engine, 54"x11', by Allaire Works; water wheels, 31' diameter by 7'9.

"City of Lawrence," 1867.—Harlan & Hollingsworth Company. Hull, 243'x40'x11'9"; beam engine, 65"x11' stroke.

"City of Worcester," 1881. Harlan & Hollingsworth Company. Hull, 328'x46'x14'5"; beam engine, 90"x12' stroke; water wheels, 36'6"x10' face; three Lobster-back boilers; consumption of fuel, 32 tons per trip.

"City of Lowell," 1894.—Bath Iron Works. Hull, 319'x 49'6"x17'7"; two triple-expansion engines, each having cylinders of 26" and 40" and 64"x36" stroke.

NEW HAVEN, CONN.

In 1813, Cadwallader Colden, an intimate friend and supporter of Fulton and Livingston in their monopoly, with a few others, made a contract with Adam & Noah Brown for the construction of the hull of the steamboat "Fulton," that was built from plans of Robert Fulton and under the supervision of Capt. E. S. Bunker. The vessel was 133 feet long, and was fitted with one of the saw-mill type of engines. The hull of this vessel was the first steam vessel that had, as yet, been built with any "dead rise" to the floors. All the steam vessels that had been constructed up to this time were for river navigation, but this vessel, being intended for a route that was more open to heavy weather, the hull was built of more than ordinary strength. She cost \$87,000, and the copper boiler over \$30,000. The vessel was completed ready for work in April, 1814, but the activity of the British naval vessels at

that time off the east end of Long Island Sound, the United States and Great Britain being then at war, was sufficient to postpone the opening of the new line to New Haven. The vessel was run on the Hudson River to Albany during the season of 1814 on the Fulton line. Her accommodations were no greater than for sixty persons, and while she was to make the trip to Albany in 13 or 14 hours, she never seemed to do better than 16 to 17 hours. The fare was \$10, of which \$3.00 was the royalty due to Fulton & Livingston.

X It was not until March 21st, 1815, that this vessel was placed on the route to New Haven. For some weeks, prior to this trip, the people in the towns along the Sound had been kept in a state of nervous anxiety in expectation of the arrival of a boat "coming from New York on wheels," and, as might be expected on the day of her anticipated arrival, there was considerable excitement in the town of New Haven. She left New York on the morning of March 21st, 1815, with thirty passengers, and arrived at her destination in 11 hours, this being the first trip made by a steam vessel from New York through Hell Gate. Her trips were usually made in from 8 to 12 hours, according to the wind and tide. It was considered to be impossible for a vessel driven by steam power, previous to this trip of the "Fulton," to stem the current of Hell Gate when the tide was running strong.

This vessel commenced running regularly at once between New York and New Haven, making two trips a week, and in the following June increased them to three trips a week, with the passenger fare at \$6.00 a trip. X She was commanded by Capt. E. S. Bunker, who superintended her construction, and continued on this route, except during the winter months, when she was placed out of commission until Y March, 1818, when the "Connecticut," a new boat, was brought out in the same interest and put on the route between New York and New Haven, while the "Fulton" was run from New Haven to Norwich, there making connections with the stages from New England, thus forming a through line from New York to Boston and the east. It was not thought to be prudent to run a steamboat from New York to such a distant point on the Sound as New London, or Norwich, Conn., at this time, so it was done by forming two lines. The "Connecticut" was a

somewhat larger boat than the "Fulton," with the same type of engine. Both of these vessels had engines that were fitted with the gearing peculiar to Robert Fulton's engines, and made noise sufficient, when in motion, to destroy the peace and comfort of those who traveled in them. A peculiarity of these engines were the uncoupling of their shafts, by which they could use their wheels or not at pleasure, as when working the engine at the dock before leaving. Neither of these boats had any state rooms, saloons, or hurricane deck. The "Fulton" was painted black, while the "Connecticut" was painted white. They were not able to carry but a small quantity of freight, as the wood necessary for fuel for the boilers occupied so much space that there was but little room left for freight.

These two boats run, as stated before, until May 27th, 1822, when they were prevented from running to any point in the State of Connecticut by the passage of what was known as the "Retaliatory law," which prevented any steam vessel running in the waters of the State of Connecticut, which were operated in the interests of, or under the monopoly of Fulton & Livingston, as granted to them by the legislature of New York State. No doubt but that this measure had some connection with the suit that was brought by Aaron Ogden, of Elizabethtown, N. J., against Thomas Gibbons, of the same place, to prevent the latter running a line of steamboats to New York from the former place, in opposition to those run by Ogden, under the protection of the monopoly. This suit was brought in New York by an injunction restraining Gibbons from running in the waters of that State, and this was granted. This was at the same time as the State of Connecticut passed the "Retaliatory law." The "Fulton" and the "Connecticut" were then placed on the New York and Providence route. Not entertaining any idea of being "frozen out" of Connecticut business by the retaliatory laws, the owners of the "Fulton," in 1822, put on a line of packets from New Haven, Conn., to Oyster Bay, Long Island, where the sailing vessels met the steamboat "Enterprise" and transferred their passengers, who were brought to New York by the steamboat.

Thomas Gibbons, in 1821, began the building in New Jersey of the "United States," which was 140 feet long, and fitted with a "square" engine by James P. Allaire, of New

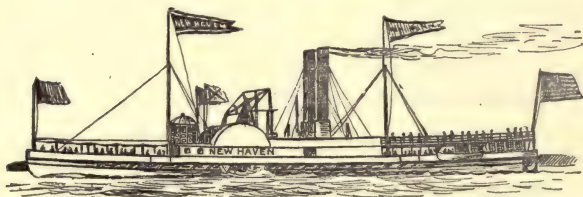
York. She was sold to New York parties before completion, and placed on the New York & Albany route as a day boat, in the spring of 1822, but those interested in the monopoly procured an injunction which prevented her running there any longer, and during the month of November, 1822, was purchased by New Haven parties, who were formerly owners in a line of sailing vessels, and were known as the New Haven Steamboat Company. In the following spring she was prepared to be taken to New Haven, where she was owned, but as she was not permitted to pass through the waters of the State of New York, under her own steam, it became necessary to have her towed by a sailing vessel, the sloop "Huntress" performing that duty, into the waters of the State of Connecticut. It is on record that the passage up the East River was of a very exciting nature. As the "United States," in tow of the "Huntress," came into the river, some of the steamboats, all of which at this time in New York waters were run under Fulton & Livingston's privilege, lying at the piers in New York City, came out into the stream, and followed up the two vessels until they got into "Hell Gate," where they endeavored by all the obstacles they could possibly put in their way to get the steamboat ashore. But in this they were not successful, as with a fresh breeze blowing from the southward the sailing vessel was able to get safely through the dangerous and treacherous currents of that locality with her tow. The "United States" had steam on her boiler, ready when she arrived in the waters of Long Island Sound, and in the jurisdiction of the State of Connecticut, to use her own power. This she did, and taking the sloop in tow, steamed away for New Haven, where she arrived the same night. This vessel cost, complete, with furniture and equipment, a little over \$22,000.

In June following, she commenced running on a regular route between New Haven and Byram Cove, Conn., which was as near New York City as she could go by the prohibitory laws of the State of New York, from which point, about twenty-five miles from New York City, it was necessary to take the stage to the latter city. This service was continued until the United States Supreme Court decided in the case of Gibbons and Ogden, in 1824, that the acts of the New York legislature, giving Fulton & Livingston the exclusive privilege

of steam navigation in the waters of that State, were unconstitutional, when she was placed on the route between New York and New Haven, landing at Maiden Lane in the former city. Passengers traveling by steamboats previous to this period were "way-billed," but the system of passenger tickets was first brought into use on the "United States." This vessel had no pilot house, but a kind of protection from the weather was rigged up for the benefit of the pilot during the performance of his duties.

1824
X In April, of the same year, the "Fulton" and the "Connecticut," which had been prohibited from running in the waters of the State in 1822, were started as an opposition line to the "United States" from New York to New Haven by the "Connecticut," while the "Fulton" connected with the latter at New Haven and run to New London. This opposition continued but a few months when they were withdrawn. After the withdrawal of these boats the "United States" continued to run until the winter, when she was laid up. X In December, of this year (1824), the "Linnaeus," then a new boat, but a small one, with one of Allaire's "square" engines, and belonging to Jonathan Peck, was put on as a winter boat, which action induced the New Haven Company to put on the "United States" for winter service also. In the spring of the next year the latter company purchased a boat named the "Hudson," built for John Livingston, of New York, and then commenced to run a daily line. About this time the "Providence," known as the "Little Providence," a boat of less than 100 feet in length, was put on as an opposition, but after a short time was purchased by the old company and run on the line with the other boats, and was commanded by Capt. Memenon Sanford a portion of the time. In 1831, they sold the "United States," having a short time previous bought the "Superior," built at New York in 1830. This boat performed 651 trips to and from New Haven without the loss of a trip. In 1832, the "Splendid" was built for the company to run with the "Superior," the former being the larger of the two boats. They were thought at this time to be the finest boats on the Sound, running as day boats, leaving New York at 6 A. M., and New Haven at 1 P. M. They continued to run until the "Superior" was sold, about 1835, for Hudson River service.

In 1835, the company had built for them by Lawrence & Sneed, of New York, another boat for the line that was named "New Haven." Her propelling power was a beam engine that was the first of that type in their boats. The "New Haven" could always be identified by her working beam, as it was not a beauty in design. In 1836, another boat was built for the line and named "New York." This one was much larger than any of its predecessors and had a "square" engine. The "Splendid" was now kept for the spare boat of the line. X The passenger fare had, at this time, been reduced to \$2.00 to New York, as Vanderbilt appeared to have an interest in the town. Previous to 1835, the mails had been carried but six days during the week, but after building the "New York" the two boats carried the mails alternately on Sunday, that was



"NEW HAVEN."

much against the wishes of the company, as they did not desire to run their boats on that day, but the Postoffice Department, at Washington, demanded it, and for a time there was considerable friction on the subject. At a later period, when Vanderbilt had control of the route, he wanted the compensation for carrying the mail increased, but the department refused, and he stopped its carriage. He was at the department's service again in a few weeks.

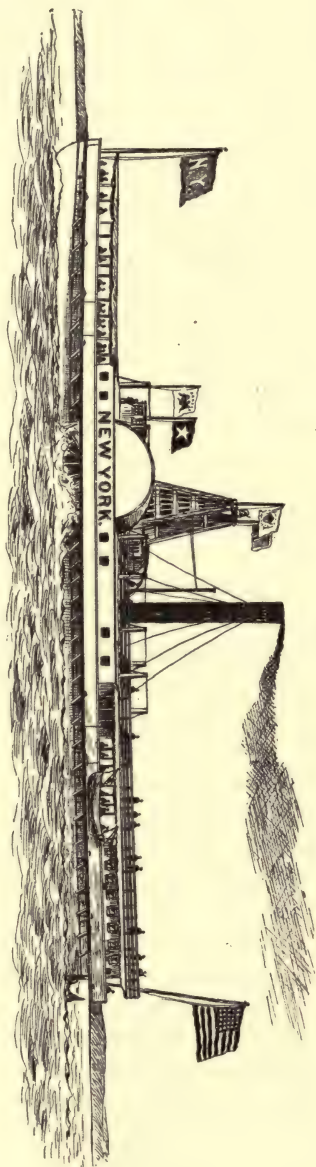
The company continued to do a very large business until March 22d, 1839, when they met with their first serious loss by the burning of the "New York" while lying at New Haven. A short time after this misfortune they sold their steamboat property to Cornelius Vanderbilt and the Connecticut Steamboat Company, the latter being the New York & Hartford

line that had owned the "Oliver Ellsworth," "New England," "McDonough," and "Globe," and the "Bunker Hill" and the "Charter Oak." The old company then retired from active business until a later period. The business of the route was now in the hands of Vanderbilt and Sanford, and it was from this that the opposition developed later.

Cornelius Vanderbilt now put the "New Haven" in commission again, and to run with her while the "New York" was rebuilding, placed on the route an old boat that had seen much service on the Staten Island & New York ferry, named the "Bolivar," that was about 120 feet long, and with a speed that it is not known how she ever got through Hell Gate on an adverse tide. To judge how fast she was when under way, and it was a fact generally known in steamboat circles at that time, that a resident of New Haven made a bet that he could drive to New York quicker than the "Bolivar" could make the trip between New Haven and New York. The matter was agreed upon, and one day he started at the same time the "Bolivar" left the dock at New Haven, and he was on the pier in New York just before her arrival.

In June, 1841, the Citizens' line was started as an opposition, they putting on the "Telegraph" that had been running on the lower Hudson River, and in the next month the "Belle," owned by Capt. Curtis Peck, and that had been on the Hudson, also was added to the opposition by the citizens of New Haven, who were much dissatisfied with the accommodations offered them by Vanderbilt's boats then on the route. Vanderbilt now withdrew the "Bolivar" and kept on the "New Haven" to run with the "New York" that now belonged to the Connecticut Steamboat Company. There was considerable life to be found, at times, on the route between the two lines until November, 1842, when the owners of the "Belle" consolidated with the Connecticut Steamboat Company, having the "New York" and the "Globe." This was the dissolution of the interest between Vanderbilt and Sanford. During this competition the passenger fares of the old line were as changeable as the weather, varying from 12½ cents to 50 cents, or as the silver currency of the country was at that date, one shilling to four shillings on different days, according to circumstances. The "Belle" was the popular boat, taking most of the freight, and

“NEW YORK,”



the larger part of the passengers with a uniform fare of \$1.00. The fare on the "Telegraph" was 50 cents. Shortly after she went on the Providence route as an opposition boat.

The "Traveler" was built for C. Vanderbilt, in 1845; and run to New Haven for many years. At this time she was much above the average speed of Sound boats, and was very popular with the traveling public. She run as a day boat, carrying the mail until the line was withdrawn in fall of 1849, by agreement with the New York & New Haven R. R. Co., who paid \$20,000 per annum for five years for closing up the day line. Occasionally, a fine boat would be put on the day line during this period, but she never remained more than a few months.

In the spring of 1848, the "Commodore," which was then a new boat, was entered on the day route by C. Vanderbilt for the Hartford & New Haven R. R. Co., and, in January, 1849, was withdrawn and shortly after was the property of the Stonington line, and in their service.

At the same time the "Connecticut," which was then a new boat, built for Capt. Curtis Peck, was placed on the route in the interests of the Connecticut Steamboat Company. This vessel run but a few months to New Haven, was then withdrawn, and placed on the Stonington route for a few weeks, and then went back to the New Haven route until January, 1849, a portion of the time as a night boat. The vessel was afterwards sold, which dissolved the company, and she was placed on the Norwich route where she remained many years. She was subsequently in use towing canal boats on the Hudson River. She has been credited with making the run from New Haven dock to New York dock in 4 hours, but this is altogether unlikely. The channel from the mouth of the harbor to the dock in New Haven in those days was not under normal conditions, such as to permit a large vessel to make very fast time. Probably to the mouth of the harbor the time was made. She was the largest of the four or five boats on the Sound, having beam engines with the shaft forward of the cylinder.

The "Cataline" was chartered in the spring and summer of 1850, and was run as a night boat, and continued until the fall of that year, when she was withdrawn. This vessel was

only 184 feet long and about 6 years old, and not the finest boat that run to New Haven.

In November of 1850, Chester Chapin, of Springfield, Mass., purchased the "Traveler" and the "Champion" from C. Vanderbilt (or the New Haven & Hartford R. R. Co.), who was now busily engaged with his coastwise line, and ran the former as a night boat between New York and New Haven, and the latter from New Haven to Hartford for a few years. At this time the "Traveler" was the only night boat, and a day boat could not be run by the interests on account of the agreement with the New York & New Haven R. R. Co. The old company had now begun operations again on the route.

In 1856, the "Elm City" was built for the New Haven Steamboat Company, and was put in commission as a night boat with the "Traveler," and, in 1861, the "Continental" was constructed for the line, and at that time was the largest boat the company had ever had, and it is generally considered the fastest of the side-wheel boats of the line at any period. The "Traveler" was now used as a spare boat, and the line was run by the "Continental" as the day boat from New York, and the "Elm City" as the night boat. In 1873, the "C. H. Northam" was built for the company, and in June of that year was placed in service as the day boat, with the "Continental," which service they continued until November 4th, 1877, when the "Northam" was laid up for repairs, and on the 27th of November was burned to the water's edge while lying at her dock for repairs to her machinery. She was subsequently rebuilt, and many improvements added over her original construction, with increased passenger accommodations. She appears to have been an unfortunate vessel to an extent, for on December 27th, 1881, she run on the rocks off Blackwells Island during a dense fog, and on August 5th, 1898, when the crank-pin of her engine "let go," and the whole main part of her engine was a wreck. It was rebuilt, and she has done service mainly since then as a spare boat.

The first departure from their wooden hull side-wheel boats was made by the company in 1892, when the steel hull twin-screw propeller "Richard Peck" was built at Wilmington, Del. The vessel has proved herself to be well adapted for the route, is well patronized by the traveling public, and has de-

veloped high speed under favorable conditions, though not as "Flyer of the Sound."

In June, 1899, the company established a new line called the "Narragansett Bay Line," by extending the route of their New Haven boats from that city to Providence, R. I. This line was operated at first by the "Richard Peck" and "Shinnecock," and later the "Lincoln," the two latter chartered vessels, as the "C. H. Northam" had been in collision with the "Richard Peck" about a week before the opening of the line. The "C. H. Northam" was in service later in the season to late in December, when the "Chester W. Chapin," a duplicate in all essentials of the "Richard Peck," was completed and took the place of the "C. H. Northam." In May, 1900, the New Haven line passed under the control of the New York, New Haven & Hartford R. R. Co. Since then they have not run a night passenger boat from New York during the winter season. In February, 1903, the New York terminal of the New Haven line was changed from Peck Slip, on the East River, where they had been so many years, to Pier 40, North River.

Starin's New Haven line was permanently established in 1882, although the "J. H. Starin" had run for one season in 1880, from New York to Shelter Island, stopping at New Haven, Conn. This vessel and the propeller "Erastus Corning" were the early boats on the line, and are still in the same service.

The New Haven Steamboat Company was organized in November, 1821, and composed of those who had been shareholders in the packet company, running between New York and New Haven, and was the nucleus of the above named company. They continued to run their boats until the "New York" was burned, when they sold out their line. Between this date, and when they resumed active operations on the route again in 1850, the shareholders held their annual meetings to preserve their charter, and regularly elected their company officers. Since the latter date, this company had been the only one that run a line to New Haven until a line of propellers, in 1866, began running, the "New Haven" and "Northampton." They run for some few years and were finally bought up by the New Haven Steamboat Company.

Prior to 1870, New Haven harbor does not appear to have had any improvements made for its navigation further than the local interests made by occasional dredging. The earliest record is of a survey made in 1846 that gave a depth in the channel of $7\frac{1}{2}$ feet at mean low water, and this was the condition found at the time of the commencement of the work on Middle Rock, at the mouth of the harbor, in 1870. The United States Government tried to remove part of this rock by surface blasting, in 1852 and 1853, but found it did not pay to use that means of removal. In 1871, the general government began dredging operations in the harbor, from Long Island Sound to the head of the harbor, with the result of a least depth of $12\frac{1}{2}$ feet. Since then dredging has been very frequent in the harbor, so as to maintain a channel across the Fort Hale bar having a depth of 16 feet. In 1882, a dike was commenced at Sandy Point, opposite Fort Hale bar, with the purpose to contract the channel at this point so as to produce a greater scour over the bar. The breakwaters at the mouth of the harbor were the first large permanent improvements made, two of them having for their bases rocks that had been at one time a serious menace to the vessels entering the harbor. It was at one time the intention to remove sufficient of these rocks to give about 18 feet clear at low water. The Southwest ledge breakwater was completed about 1888, the Luddington Rock breakwater about 1894, and the West breakwater is now nearly finished. Operations have been in progress during the last three years to maintain a channel about 80 feet in width, and 20 feet deep across Fort Hale bar, and from this bar to the Canal dock, a channel 18 to 20 feet deep and 400 feet wide, but it is not safe at low water for a vessel drawing over 15 feet. The increased size of passenger steamers running here in the last eight years has made a demand for greater depth of water in the channel of the harbor.

The light in the lighthouse on Five-Mile Point, east side of entrance to New Haven harbor, was discontinued on January 1st, 1877, and on the same date the light located on Southwest ledge entrance to the harbor was lighted for the first time. Was about four years building the latter lighthouse on account of its exposed situation.

"Hudson," 1826.—Hull, by Brown & Bell, 108'x23'x6'5"; square engine, 24"x6' stroke.

"Superior," 1830.—Hull, by Smith, Dimon & Comstock, 130'x21'x7'6"; square engine, 36"x8' stroke.

"Splendid," 1832. Hull, by Smith, Dimon & Comstock, 130'x21'6x8'; square engine, 37"x7' stroke.

"New Haven," 1835.—Hull, by Lawrence & Sneed, 178'x22'8x9'; beam engine, by the Allaire Works, 47"x10'.

"New York," 1836.—Hull, by Lawrence & Sneed, 212'x22'10x10'x5' draft loaded; square engine, 50"x10' stroke; water wheels, 24'x11' face.

"Traveler," 1845.—Hull, by Bishop & Simonson, 225'x29'x9'6"; beam engine, by Allaire Works, 52"x11' stroke; water wheels, 29'3x8'; two iron boilers; average pressure of steam, 30 lbs.

"Connecticut," 1848.—Hull, 300'x37'x10'6x7' draft; beam engine, 72"x12' stroke.

"Elm City," 1856. Hull, by Samuel Sneed, 280'x35'x11'; beam engine, by Neptune Iron Works, 65"x12' stroke, and water wheels, 34'6x9' feet face.

"Continental," 1861.—Hull, by Samuel Sneed, 282'6x35'8x11'5"; beam engine, by Morgan Iron Works, 70"x11' stroke; water wheels, 34' diameter.

"C. H. Northam," 1873.—Hull, by John Englis & Son, 312'x44'x14'; beam engine, from Lake Erie Steamboat, rebuilt and erected on board by Quintard Iron Works, with cylinder 80" diameter by 12' stroke.

"Richard Peck," 1892.—Hull and machinery by Harlan & Hollingsworth Company, 303'x48'x17'8"; two triple-expansion engines, each with cylinders 24" and 38" and 60" by 30" stroke; twin screws.

"Chester W. Chapin," 1899.—Hull and machinery by Maryland Steel Works, at Sparrows Point, Maryland; hull, 312'x48'x64' over all x16'9"; two triple-expansion engines, with cylinders, each 24" and 38" and 60" by 30" stroke.

"New Haven" and "Northampton," 1866.—Propellers; hull, 160'x30'x10' by 8' draft; one condensing engine, 34"x38".

HARTFORD, CONN.

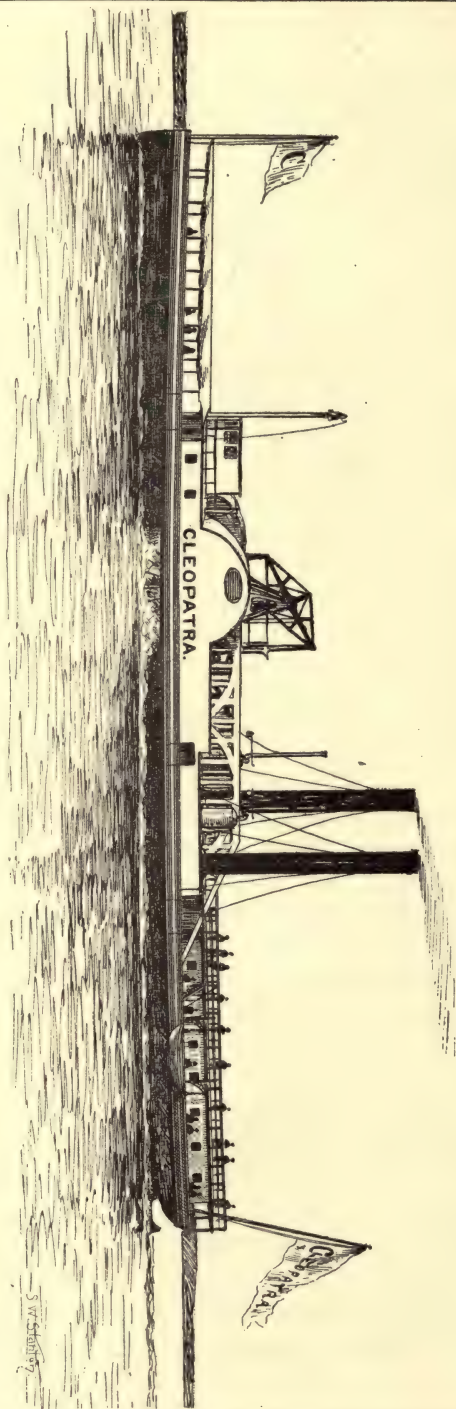
XJust after the embargo on steam navigation, in the State of New York, had been raised by the decision of the U. S. Supreme Court, in 1824, the Connecticut River Steamboat Company had built for them by Webb & Allen, of New York, the "Oliver Ellsworth," a boat of 227 tons that was the first to run between Hartford and New York. When about three years old and on a trip from Hartford to New York and near the mouth of the river, her boiler exploded, by which occurrence three lives were lost by scalding. In 1826, the "McDonough," of 313 tons, was built for the line, and a short time after the "Globe" was added. In 1833, the old boats proving too small for the business, the "New England" was built at New York. X On October 9th, of same year, when opposite Essex landing, both of her boilers exploded at about the same time, causing the death of fifteen persons and badly scalding about ten more. This explosion was the subject of an investigation by a board of experts and engineers for the Steamboat company, composed of Professors Silliman and Olmstead, of Yale College; W. C. Redfield, superintending engineer of the Steam Navigation Company, of New York; Daniel Copeland, of Hartford, Conn., engineer and builder of steam engines, father of the late Charles W. Copeland, engineer, of New York City; and John W. Lawson, engineer of the steamboat "Chief Justice Marshall." They gave the subject a very exhaustive examination, and made a report which was published at the time that received a great deal of attention from those interested in steam navigation. The "New England," shortly after this explosion of her boilers was repaired, and run during 1834 under Capt. Memenon Sanford, and was then sold to parties who put her on the coast of Maine route.

In 1835, the same company had built, at New Haven, Conn., the "Bunker Hill," of 356 tons, and, in 1838, the "Charter Oak," of 440 tons, for the Hartford route. In 1836, the "Cleopatra" was built for Cornelius Vanderbilt for the same route. The engine of this vessel was set in the hull similar to many of those on the Hudson River, with the shaft forward of the cylinder. The "Charter Oak" was a very able boat for her day, and during the period of the competition between Vanderbilt

and Sanford on the route, which was at times pretty sharp, was able to hold her own. With Capt. Jacob Vanderbilt on one side, and Capt. Mem. Sanford on the other side, what could be expected but lively times under such conditions? It is believed that Captain Sanford was about the best match that Commodore Vanderbilt found in his experience of competition with steam vessels. It was about as lively on this route, at times, as it was on the Hudson River, putting their rival ashore in the river, or cutting him off from a landing, when possible, being a part of their amusement. In 1835, the "Lexington" was on this route for a short time, being then a new vessel. After the "Charter Oak" and the "Bunker Hill" were taken to the coast of Maine, the old company put in service the "Globe" and the "Kosciusko," two old timers, that run during the busy portions of a few years. Subsequently, the "Champion," and the "Hero," owned by Captain Peck, were on this route, where they formed a daily line until the New York & Hartford Steamboat Company was organized in 1853, when the "City of Hartford," built in the same year, was put in service, and the "Granite State," the following year, was added to the line. In 1866, another new boat was built, the "State of New York," afterwards known as the "City of Springfield."

For a few years, prior to 1882, the company had been subjected to very heavy losses on account of accidents which had happened to their vessels, and, in January of that year, withdrew their vessels from the route. In the next month the "Columbia," that had been in the summer season on the New York and Rockaway route, was run to Hartford three days in the week, which she continued until 1883, when the old company, having been reorganized once more, placed their old boats on the route. The "City of Springfield" continued in service until about 1895, and the "Capital City" x "Granite State" went ashore in a fog near Stamford, Conn., and became a total loss in 1889. The "City of Richmond," that had been running on the New York & Sandy Hook route, was purchased and her hull strengthened before being placed on the line, but was burnt to the water's edge on the afternoon of March 5th, 1891, while lying at her wharf at New York. The remains of the burned hull were subsequently rebuilt upon and named the

"CLEOPATRA." HARTFORD LINE.



"Wm. C. Egerton," since renamed "Glen Island," by John H. Starin, in the excursion business.

The company, in 1892, had built by Neafie & Levy Co., the propeller "Hartford," and, in 1896, the same builders constructed the "Middletown," the latter being in service at this date. The "Hartford" was sold in 1898 to the U. S. Quartermasters' Department for Cuban service and named "Terry," and another vessel built at Baltimore, Md., in 1899, slightly larger and given the same name. The "Terry" was sold in 1901 and sent to Lake Erie for foreign account.

From 1847 to 1852, there run from New York to Hartford a line of small propellers, composed of the "Sachem," the "Seneca," and the "Uncas," for freight only.

There were some light-draft boats on the Connecticut River, plying between Hartford and Springfield previous to the opening of the railroad. The "William Hall," built at Hartford in 1831, with a high-pressure engine. At the same time there was the "John Cooley," built at Springfield, Mass., with a high-pressure engine. In 1833, the "Massachusetts," built at Springfield, for Chapin & Deming, and in 1837 the owners of the "Massachusetts" had constructed the "Agawam," the engine being built by Daniel Copeland, of Hartford. All these vessels had high-pressure engines—non-condensing—and were propelled by stern wheels, and with a depth of hold of about 4 feet. They were not over about 90 feet in length. There was also a high-pressure boat named the "Middletown," built in 1837, running between Hartford and Saybrook, and at the same time the "Kingston," of 213 tons, was running on the same route.

The "Champion," which was the property of Commodore Vanderbilt, and at one time run between New York and Hartford, started on a trip down the coast in 1838, for the purpose of testing her speed with the fast boats, so-called, that were then on the rivers. There was at the time on the Potomac River the "Sidney," which was estimated to be of high speed for those days, but the "Champion" found it no trouble to pass her, doing it without being pressed very hard. In some of the trials she had there was a consideration pending on the result, in all of which the "Champion" came off victor. She at last arrived at New Orleans, La., where a match was made with one

of the best, at that time, of the Mississippi River steamboats (high pressure) for a trial, or race it might be more properly called, from New Orleans to Louisville, Ky. The day was fixed, and all was in readiness at the appointed hour, and they started on the race. But previous to this the engineer, who had brought the "Champion" down the coast as far as New Orleans, was superseded by one of the Mississippi River engineers (high pressure), and he, before starting, had altered the set of the valves, and after she had gone but a few miles up the river, sprung one of the lifting rods of her engine, which made it necessary for her to return to New Orleans for repairs. The injured rod was repaired, and she proceeded on her way again, but, as was to be expected, had lost so much time in returning to New Orleans and in making the repairs that she lost the race and the investment on the result. Her running time between the two cities was such that, in all probability, had her engine not broken down, she would have given a good account of herself at the finish. She was sold in the fall of 1838 to parties at Pensacola, Fla. The boat was but about 160 feet long, and had a beam engine built by the West Point Foundry, at New York City.

BRIDGEPORT, CONN.

✕ In 1838, the "Fairfield," one of Captain Peck's small boats, was running from New York to Bridgeport during the summer and fall, but discontinued the service during the winter months. The "Nimrod" was running here from about 1833. ✕

The Housatonic R. R. was opened for business in 1838, but not completed until 1842, and the "Nimrod" was run in connection with the railroad from the earlier date. She was then owned and commanded by Capt. John Brooks, and run to Bridgeport as late as 1850. In 1848, the railroad company purchased from the People's line the "Niagara," and continued her in service until about 1853. This boat was too large, and of too great draft of water for the route at that time. There were other boats that run here the next few years, the most promi-

ment of them being the "Mountaineer" that had been on the lower Hudson River, and was a boat of some size and speed.

The "Bridgeport" was the first boat of any size that run regularly on the route for a period of time, being placed in commission in 1857 and run until broken up in 1889.

For about five years from 1843, the Housatonic R. R. was the best means of communication during the winter months, when the Hudson River was closed by ice, from New York to Albany, being all rail by the way of Bridgeport to West Stockbridge, and thence to Albany.

In 1857, an opposition line was started with the "Cataline," built in 1844, and having a "square" engine of 40" by 10' stroke. This vessel had seen much service on the Hudson River, prior to her employment on the Sound. Shortly after, the Naugatuck Transportation Company, that run the "Ansonia" to Derby, Conn., placed that vessel on the Bridgeport route.

In 1859, the "John Brooks" was built at New York for the same interests as run the "Ansonia," and with the purpose to make better time than any boat running west of New Haven, and to cut into the New Haven railroad passenger business. Her best record is given as 3 hours and 1 minute. During her first year in 80 consecutive trips between New York and Bridgeport, the average time was 3 hours and 22 minutes to a trip, but between what points there is no record. The hull of this vessel was 250'x34'x11', and fitted with a beam engine 56"x12', built by Morgan Iron Works. In March, 1862, the Quartermasters' bureau chartered the vessel, and it was in almost continuous service for the government until August, 1865, part of the time at \$800 per day, then \$700 per day, and the last charter was at \$351 per day, the owners furnishing everything except coal. In 1867, the vessel was sold to parties for use on the coast of Maine, where she was worn out.

After the "John Brooks," the old company run the "Bridgeport" and "J. B. Schuyler," and subsequently added the "Waterbury" x "Laura," an iron hull and beam-engine boat built in 1867.

In 1879, the "Rosedale," a fine side-wheel boat that was constructed in 1877, and whose dimensions of hull were 216'x34'x10', with an engine of 50" cylinder and 12' stroke, was started as an opposition line and run as such for a few years,

but was subsequently taken into the regular line. In 1892, a propeller was built at Noank, Conn., to take the place of the "Waterbury," and run in connection with the "Rosedale," named the "Nutmeg State." This vessel was lost by fire while on a trip from Bridgeport to New York, on the morning of October 14th, 1899, when about two miles east of Execution light, and was totally consumed with the loss of seven lives, passengers and crew of the vessel. The company subsequently purchased the iron-hull propeller "Allan Joy," larger than the "Nutmeg State," that has been a valuable addition to the line.

In 1902, the Harlan & Hollingsworth Company completed for the company a steel hull side-wheel boat, larger than the "Rosedale," that had now seen her best days, named "William G. Payne," having an engine of the inclined-cylinders compound type. There was considerable stir along the Sound in the early summer, by the claim of fast time made by the new boat. On June 27th, when about one month in commission, a trip was made from New York to Bridgeport with an adverse tide, from New York dock to Great Captains Island, and from the latter point to Bridgeport, having a favorable tide with the boat. The elapsed time between the several points is stated on another page. This was one of the best trips made during the first season, and at the time was within hail of the "Richard Peck." While thus far she has shown herself, at times, to be, under favorable conditions, a very fast steamboat, still, she appears to be erratic in her speed. Poor coal may be one reason, but probably some changes in the vessel may be of advantage. If the vessel had been given a little more head room on both the main and the upper deck, she would have appeared in better proportion of her height to her length. The Bridgeport line was absorbed by the New York, New Haven & Hartford R. R. Co., in February, 1903.

There was an iron-hull propeller named "Naugatuck," built in 1844, at New York, for the Ansonia Brass & Copper Company that run to Derby, Conn., for a few years. This vessel was 105 feet length on deck and 6 feet 8 inches depth of hold. The vessel was the subject of several experiments with her motive power by her subsequent owner, E. A. Stevens, of Hoboken, N. J., and during the Civil War was in service on the James River, and Sounds of North Carolina. In later years,

the vessel was in the Revenue Marine service in the shoal waters about North Carolina, under the name of "E. A. Stevens," and later was sold to Baltimore parties.

Bridgeport harbor, prior to 1836, would not admit vessels drawing over 5 feet of water at low water, as that was the depth on the inner and the outer bars. Congress made an appropriation in 1836, of \$10,000 for dredging the outer bar, and, in 1838, a depth of eight feet was obtained. Nothing further was done until 1852, when \$10,000 was again appropriated for dredging, and in 1853 and 1854 work was done on the inner and the outer bars, the latter having filled up some since 1838, resulting in an average depth of 8 feet at low water. But very little was done to further improve the harbor by the government, until 1871, when the stone breakwaters were commenced and dredging again resorted to, since which time vast improvements have been made for the marine interests of the city. Work has been in progress for a few years to increase the depth of water in the main channel to 18 feet, with two anchorage basins of 12 feet deep.

The formation of these bars at the entrance of many of the harbors on the Connecticut shore is thus referred to by an eminent engineer officer at the time of the construction of the jetties. "On the north shores of the Sound the headlands are composed frequently, and on the south side always, of accumulations of the glacial period, consisting of large and small boulders and diminishing in size down to pebbles, sand and clay."

"These headlands are being continually abraded (as there is evidence that the shores are gradually sinking) by the waves. The clay mingles with the water and is borne away to great distances, and deposited often at the greatest depths.

"The sand at ordinary times is kept in motion by the rise and fall of the waves, and their general motion being westward in Long Island Sound, the resultant is, with occasional intermissions, a progress of the sand westward. This action takes place between the high-water line and the line of depth, which limits the action of the wave. In heavy storms, stones of a foot in diameter are also thus moved along the shore. The large boulders, in all cases, remain at the foot of the abraded hill from which they fell, but have in few cases, if any, accu-

mulated in sufficient quantity to stop the further abrasion of the headlands by the waves. The supply is thus kept up, and the drifting is constantly going on. Examinations at all the points on the Long Island shore show this movement to be to the westward, and it must be everywhere, even if there seems to be no perceptible change in the entrance to any particular harbor, and it must, therefore, be going on across the harbor of Bridgeport."

Then another theory held regarding the formation of bars at the mouth of rivers was, that the sand and mud, which is drifted along the bottom by the river current, passes into the sea until it meets the dead angle formed by the rising of the fresh river water over the salt water, when it is deposited and forms the bar.

"Nimrod," built 1833; hull, 175'x20'8x8'; with beam engine, 40"x9'.

"Bridgeport," built 1857, by Samuel Sneed, at Brooklyn, N. Y.; hull, 230'x34'x10'; with a beam engine, 56"x12'.

NORTH SHORE—LONG ISLAND.

✕ In the early days of steam navigation, there was no intercourse from this locality with New York, by water, other than by sailing vessels, and it was not until after 1830 that the steamboats began to run to the nearby Long Island villages on the North Shore.

Capt. Elijah Peck, of Flushing, had, as early as 1831, the "Linneaus" in service to Flushing, and this vessel having been sold a few years later to parties at Philadelphia, the "Star" and the "Fox," and in 1838, the "Statesman" were put on the route, and, at times, these vessels ran as far east as Glen Cove, stopping at all the landings on the way. They were small vessels, not more than 110 feet long, with a "square" engine, some times called the "saw-mill" engine, a type that has passed out of use for marine purposes many years ago. ✕ In 1850, the "Island City," a much larger and more modern vessel, built by Thomas Collyer, was put on as an opposition line, and in 1852, Captain Peck withdrew his vessels from the route, and the "Island City"

was the only boat running to Flushing until about 1860. She was purchased for the transport fleet and subsequently sold to Philadelphia parties. There was afterwards the "Osseo," making Flushing one of her landings, and later still the "Harry Hill." There was also a small propeller named "Flushing." The Boyer line of propellers for freight service have, of late years, served the landing. The opening of the railroad was the ending of the passenger service by water.

In 1845, and for a few seasons after, the "American Eagle," a larger and much better vessel than her predecessors, was running to New Rochelle, Glen Cove and Cold Spring. About 1848, the "Croton" was on the Glen Cove route, and was the largest steamboat to Hempstead Bay to that date, being 180'x25'x9', with a "square" engine. This vessel found it more profitable on the route than those before mentioned, for she continued the service until 1854, when a new boat having been constructed for the route, the "Croton" was put in the excursion business, and during the early part of the Civil War was purchased by the War Department, and sold when the strife was over for service in South Carolina waters. She would be thought an odd looking boat in these days. In 1852, she run to Whitestone, Glen Cove, Oyster Bay, and Cold Spring, and during the summer of 1853 made two round trips daily to Glen Cove, leaving New York at 9.30 A. M., to Whitestone and Glen Cove, and at 4.15 P. M., to Whitestone, Glen Cove, Glenwood, and Roslyn.

The "Glen Cove" was built in 1854, to run on this route by her builder, Thomas Collyer, one of the noted shipbuilders at that time for fast river boats. This vessel was 195'x32'x8'6, and fitted with a vertical beam engine that was formerly in the ill-fated "Henry Clay," that was burned on the Hudson River in 1852. This vessel was a fine looking boat, as well as a fast one. The "Reindeer" and the "Armenia," of the Hudson River day lines, were constructed by the same builder. The "Glen Cove" was run by the New York and Glen Cove Steamboat Company until June, 1856, when sold to S. H. Townsend, of Oyster Bay, as differences in the company had arisen. Her new owner placed her on the Hudson River day line during the next month, where she made some fast trips. The traveling public did not appear to have the greatest confidence in the vessel, probably on account of her engine having been in the

"Henry Clay." Her engine was, no doubt, operated under comparatively high steam pressure, but she never met with any accident from that cause while in these waters.

The same company, in 1859, had built at Brooklyn, N. Y., the "Long Island," with hull dimensions of 191'x29'2x8'9, and a beam engine. This vessel was intended for high speed, but did not attain it until her power was increased the second year to a 46"x12' stroke engine. The landings then included Great Neck, Sands Point, Glen Cove and Roslyn. In 1861, Thomas Collyer had come into possession of this vessel, and he run her and the "Mayflower" to Glen Cove for passengers at 20 cents fare, and to Great Neck and Sands Point for 10 cents fare. This appears to have had some connection with his former service to the landings east of Glen Cove, and to drive off the "T. V. Arrowsmith." He was very active in the opposition



" GLEN COVE."

line business this season, being hotly engaged most all the year at Keyport, N. J., where some of his former competitors on the Hudson River were running a line, and where the "Arrowsmith" belonged, and where the sparks were flying freely. In the summer of 1862, he chartered the "Long Island" for transport duty at \$450 per day. She was partially burned while in the Neuse River, North Carolina, was rebuilt, sold to the War Department in April, 1863, for \$50,000, and in August, 1865, sold to S. J. Pentz, of Baltimore, Md., for \$18,000, and has been running in Chesapeake Bay under the name of "Samuel J. Pentz," and was still doing duty there a few months ago.

In 1862, the "T. V. Arrowsmith," from the New York and Keyport route, was running to the North Shore landings, and in 1862, 1864 and 1865 the "Jessie Hoyt," a new boat from the Hudson River, and one not to be ignored by any of her size,

was covering the route. The "Arrowsmith" was about the same size, but was never counted on for any speed. She run here also, in 1863, with a morning freight boat, named "Minnie" x "George Law," one of Thomas Collyer's fleet he had run to Oyster Bay. The passenger fare at this time was 25 cents, and this in the time of expanded prices of all commodities.

There were no others until the "Seawanhaka," built by B. C. Terry, of Keyport, N. J., in 1866, who built many of the medium-size river boats of that day that turned out very able steamboats. This vessel was originally 200'x29'6x10', but was subsequently lengthened about 30 feet, and fitted with a beam engine of 50" cylinder by 10' stroke. She was an able and speedy vessel for her dimensions and power, but it is doubtful if more so than the "Glen Cove," or "Long Island," or possibly the "Jesse Hoyt." It was during her first or second year that a landing was made at Sea Cliff. In 1871, the "T. V. Arrowsmith" was a morning boat from New York, while the "Seawanhaka" run the afternoon trip. In 1873, the "T. V. Arrowsmith" run from New York in the morning again, landing only at Glen Cove and Sea Cliff: the latter landing began now to assume some importance during the summer season. The "Seawanhaka" made all other landings in the afternoon. This vessel performed the work of the regular line very acceptably until June 28, 1880, when, on the afternoon trip from New York and off Ward's Island in Hell Gate, a fire was discovered in the hold of the vessel, caused, it was believed, after a thorough investigation by the steamboat inspectors, from back draft in the boilers throwing live coals from the furnaces and igniting the woodwork of the vessel, that was run ashore, but not before many persons had been drowned by jumping overboard. About forty lives were lost in all. The vessel proved a total loss.

The "Idlewild," built in 1876, and run to Coney Island and other places around New York, was the successor of the "Seawanhaka," and was 179'9x32'9x9'3, with an engine of 48"x10'. This vessel was destroyed by fire, while lying in winter quarters at Brooklyn, N. Y., in January, 1901.

The "Nantasket," built in 1878, by Pearce & Montgomery, of Chelsea, Mass., for the Boston & Hingham Steamboat Company, is 173'x29'x9', with a 46"x8' stroke

engine, run there in 1901, and 1902. She run in Boston harbor until the company built three or four larger and much higher-powered vessels to perform the work demanded on this route. There have been several more able and better furnished steamboats at different times on this route, when the population of the villages were comparatively small to what they are to-day, than the present means of transportation by water. In 1903, the "Orient" was running in place of the "Nantasket."

To Oyster Bay, Cold Spring and Northport the "Croton" run at periods, and, in 1859, while running or making a landing at Glen Cove, run to these landings. The service here has never been for any extended period very regular. Thomas Collyer run the "George Law," a boat of 154 feet long, and at times the "Mayflower," with a "square" engine bought from a Boston route, a larger boat than the former, to Oyster Bay and Northport up to about 1858. After the "Croton" came the "Long Island" for a period before going into the transport service. The service was now very irregular until after 1865, for the next year the "D. R. Martin" was the regular boat to these landings up to and including the year 1870. In 1867, the "Mattano" was running to Willetts Point, and Northport. Since the "D. R. Martin," the only boat to cover this landing was the "Shady Side" for a time. The extension of the Long Island Railroad to Oyster Bay, in 1889, has cut off all transportation by water.

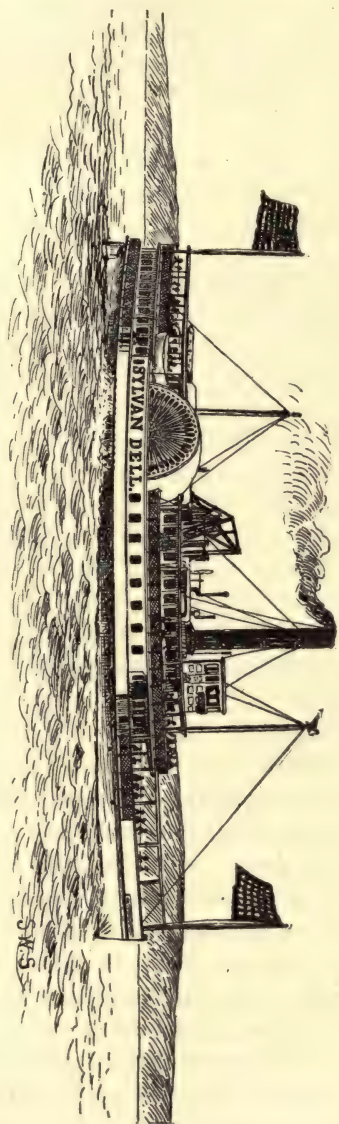
To Sag Harbor, the "Island Belle," built in 1852; ran for a few years, and was succeeded by the "Cataline" that had been on the Bridgeport line, and later by the "Massachusetts." Afterwards, the "Edward Everett," the "Stamford," the "Artizan," and the "Escort" that run from 1871 to 1876, and since then the "W. W. Coit," built at Mystic, Conn., in 1864. In 1886, the Montauk Steamboat Company that has since passed under the control of the Long Island Railroad Company, had built the "Shelter Island," and in 1890 the "Montauk," and in 1896 the "Shinnecock." These are steel-hull vessels and the best that have been on the route. The latter is much the larger of her predecessors. The "Shelter Island" was chartered to run in Florida waters in 1896, and on her first trip from Miami to Key West, on February 20th, 1896, struck on rocks and sunk

off Logger Head Key, proving a total loss. The "Montauk" was sold in the spring of 1902 to Canadian parties, for service on Lake Erie, and named "King Edward." The company has since added a boat purchased from one of the coast of Maine routes.

HARLEM AND MORRISANIA.

There had been at various times, prior to 1856, steamboats running to Harlem from the lower part of the city, but not for any extended time. That part of the city was then sparsely settled to what it was ten years hence. In the former year the Harlem Steamboat Company was organized, and the same year the "Sylvan Shore" was built for them by F. Boole, and in 1858, the "Sylvan Grove," built by George Collyer, was added. These two boats were competent to care for all the business of the company until the "Sylvan Stream" was added in 1863. In 1869, Lawrence & Foulks built the "Sylvan Glen." Shortly after, the "Sylvan Shore" was sold to parties in New York, who put her in service on the Savannah River, Ga., and afterwards around New York, and her hull was finally broken up about 1877 and her engine put in Brooklyn Annex ferryboat, No. 1. In 1872, Lawrence & Foulks built the "Sylvan Dell" for the company, and she proved herself to be a very able boat, and one possessed of higher speed than any boat of her dimensions around New York, as was fully demonstrated on more than one occasion. On October 18th, 1872, she made a trip from New York to Albany, without passengers or making landings along the river, in 7 hours and 43 minutes, details of which run will be found under "High Speed."

After the opening of the Third Avenue Elevated R. R. to Harlem, in 1879, the passenger travel by boat was reduced to such an extent as to make it no longer profitable to continue the service, and soon after the boats were withdrawn and subsequently disposed of for other service. The "Sylvan Dell" and the "Sylvan Glen" went to the Delaware River, and the "Sylvan Stream" to Lake Ontario. The machinery of all these boats was built by Fletcher, Harrison & Co.



“SYLVAN DELL.”

In 1871, the Morrisania Steamboat Company had built for them the "Morrisania," and the next year the "Harlem" was finished and added to the line, and, in 1873, the "Shady Side," which had been running a short time on the New York and Fort Lee route, was purchased and added to the line. These boats run until 1879, when the Elevated Railroad affected their passenger travel the same as the Harlem Company, and they were withdrawn from the route, and in 1881 were sold under foreclosure of a mortgage.

These lines run a fierce opposition for some years, and the trials of speed between the opposing boats, when they came together, were at times very exciting, especially after the "Sylvan Dell" was built. The "Shady Side" had proved herself a very able boat for her size when on the Fort Lee route, and was brought around on the Morrisania route, with the hope of being an equal of the "Sylvan Dell." She was a vast improvement over the original boats of the line, but was not always able to hold her own with the "Sylvan Dell." The "Shady Side" has been running to one of the nearby Connecticut landings for some years.

CHAPTER VI.

LAKE ERIE AND LAKE ONTARIO.



STEAM navigation on the lakes dates from the year 1818, when the steamboat "Walk-in-the-Water" was built to ply on Lake Erie. The hull of this vessel was built at Black Rock, N. Y., by Noah Brown, of New York City, for James B. Stuart, of Albany, N. Y.; Robert McQueen, of New York City, and others. The vessel was 135 feet long, 32 feet beam, and 8 feet 3 inches depth of hold, and was brig-rigged. The engine was a low pressure of the "square-engine" type, having a cylinder of 40 inches diameter and 4 feet stroke, built by Robert McQueen. This engine was transported by sloops to Albany from New York, and from there to Buffalo by six and eight horse wagons, taking from 15 to 25 days for the delivery. The materials for the boiler were sent to Black Rock, and the boiler built near where the hull was constructed. It was of copper, 24 feet long and 9 feet diameter, with one "kidney" flue. The engineer of the vessel was James Calhoun, of New York City.

✓ The first trip of the vessel was from Buffalo to Detroit, leaving the former port on Aug. 20th, 1818, under Capt. Job Fish. The time consumed in the trip was usually 36 to 40 hours in good weather, and using 36 to 40 cords of wood in the boiler during the same period. The passenger fare in the main cabin was \$18 between Buffalo and Detroit; between Buffalo and Sandusky, \$15; between Buffalo and Cleveland, \$12; and between Buffalo and Erie \$6.00. ✕

The strength of the rapids at the head of the Niagara River between Buffalo and Black Rock was so great that, besides the power of the engine, the steamer had to have the aid of eight yoke of oxen to get her up on the lake, a distance of about 2½ miles. In those days the passenger and freight traffic was so limited on the lakes that one dividend

only was made to the owners for the three years from the earnings of the vessel.

Mr. Calhoun, the engineer of the vessel, said in later years, of his experience in those early days: "Every two years I used to return to New York from Buffalo in the fall, and in the spring return to Buffalo. I have been three or four days by stage to Albany, never less than three days, and sometimes near five days; the stage fare was \$10 to Albany. From Albany to Buffalo I have been ten days in getting through—the shortest time was eight days. The stage fare through was \$21. My usual expenses in going from Albany to Buffalo were \$30, including hotel expenses." X

After doing service a little over three years, the vessel was wrecked in Buffalo Bay, during a heavy gale on November 1st, 1821. No lives lost.

In 1822, Noah Brown also built the "Superior" for the same owners at Buffalo, N. Y., as a successor to the "Walk-in-the-Water." This vessel was of different proportions in the hull from her predecessor, while but 9 feet shorter was over 11 feet less beam, with over 2 feet greater depth of hold. The dimensions were 126'x20'8x10'6. The machinery was recovered from the wrecked vessel and placed in the "Superior." This engine was subsequently fitted in the steamboat "Charles Townsend," built in 1835, at Buffalo, by Carrick & Bidwell, after the "Superior" had been altered into a sailing vessel by the removal of her machinery, and used in the lumber trade on the upper end of Lake Erie, and was lost in 1843.

In 1824, the "Chippewa," of 100 tons; and in 1825, the "Henry Clay," of 348 tons, were built, but both were broken up after short service. In the latter year the "Pioneer" was built by Benj. Winslow, for A. S. and P. T. Porter, Sheldon Thompson and 19 others, at Black Rock. Length, 98 feet; beam, 16 feet 9 inches, and 8 feet depth. This vessel was twice wrecked—once at Grand River, Ohio, in November, 1825, and was finally beached in a gale of wind near Chicago, in July, 1834.

In 1829, there was built at Portland harbor, Chautauqua County, New York, the "William Peacock," by Asa Standart, for Eliphalet Tinker, Joseph White and 30 others. Length, 102 feet, 19 feet beam, and 7 feet 6 inches depth of hold. The

vessel was originally fitted with a low-pressure engine, built at Troy, N. Y., but after running one season this was removed and one on the high-pressure principle, built by Stackhouse & Tomlinson, at Pittsburg, Pa., erected in its place, with four boilers under the deck. On September 16th of the same year, as the vessel was leaving Buffalo harbor for Detroit with a heavy head sea running, her steam pipe broke, there being no slip joint in the pipe, resulting in the loss of fourteen lives—all passengers. She finally went ashore near Erie, Pa., in 1832, and became a total loss.

In 1834, there was built at Perrysburg, Ohio, by Augustus Jones, for the Perrysburg Steamboat Co., the "Commodore Perry." This vessel was 146 feet 2 inches long, 26 feet 4 inches beam, and 9 feet 9 inches depth of hold; was fitted with one horizontal high-pressure engine, built by P. B. Andrews, of Cleveland, Ohio, with boilers below deck. These boilers were the subject of two accidents during the first season by the collapsing of the flues, due to defective iron of which they were made, and resulting in the loss of four lives.

There was running from Buffalo a few years later, the "Buffalo," of 613 tons; the "DeWitt Clinton," of 413 tons; the "Wisconsin," of 490 tons, built at Conneaut, Ohio, and having an engine that was taken from the "Ohio," on the Hudson River; "Robert Fulton," of 368 tons; "Milwaukee," of 401 tons, built at Grand Island, in 1837, and fitted with a beam engine from the West Point Foundry, New York City. This vessel was 172'x24'x10', and was wrecked on Lake Michigan, in 1842; "Charles Townsend," of 312 tons; "Daniel Webster," of 358 tons; "Constellation," of 483 tons; "Fairport," of 259 tons; "Red Jacket," of 158 tons, a small boat of 110'x16'x8', built at Grand Island in 1838, for Niagara River service, with a beam engine taken from steamboat "Victory," on the Hudson River. Eight of these vessels had low-pressure engines, all being built at New York, either by the Allaire Works, West Point Foundry, or Birbeck & Co., and four with high-pressure engines, built by Ward & Benne, of Pittsburg, Pa.

The "Caroline," that was brought into such prominence in 1837 by being burned by a body of Canadian militia during an attempted invasion of the province, was a small vessel of 46 tons, and was built at Charleston, S. C., in 1824. She run on

the Hudson River between Albany and Troy about 1834, after which she was taken through the Erie Canal to Buffalo, which was accomplished by taking off her wheel guards. A short time after she was rebuilt at Ogdensburg, N. Y., and subsequently went to the Niagara River, where she was burned as previously mentioned.

Among the largest steam vessels on the lakes prior to 1840 was the "James Madison," being 178 feet long, 30 feet 9 inches beam, and 12 feet 6 inches deep, draft of water 10 feet. Was fitted with a high-pressure engine of 28-inch cylinder and 8 feet stroke, built at Erie, Pa. The passenger accommodations were the best of her day, and the service covered the route between Buffalo and Chicago, a distance of nearly 1,000 miles. Another fine vessel was the "Cleveland," built in 1837, at Huron City, for Griffith, Beebe, Allen & Co., with a beam engine built by the West Point Foundry, of 50-inch cylinder by 10 feet stroke. The hull dimensions were 180'x29'x11'8". Was destroyed by fire at Tonawanda, N. Y., in 1854.

The most radical departure in steamboat design and construction in the early days was that made in the building of the "Great Western." This vessel was built at Huron, Ohio, in 1838, and was 186'x34'x13', with a high-pressure engine, 29-inch cylinder by 10 feet stroke, and seven boilers. During the two years in which this vessel was building, and also after her appearance upon Lake Erie in service, those who were supposed to be judges in lake navigation expressed grave doubts of the seaworthiness of that type of vessel. But in a few trips she became a favorite with the traveling public, notwithstanding the opinions and prejudices of a few. This was the means of making great changes in the construction of steam vessels on the lakes, converting the lower cabins into steerage quarters and freight compartments, and adding the upper cabin with state rooms. The vessel was designed and modeled by Capt. A. Walker, her owner. She was partially destroyed by fire in 1839, but was rebuilt and continued in service until 1855, when broken up. The "Anthony Wayne," and the "James Madison" had, previous to this, on the upper deck, between the wheel houses, each a few rooms used for smoking rooms and card playing, but those on the "Great Western" were the first with state rooms for passengers on

the lakes. State rooms had many years before this been in use on some of the Mississippi River steamboats.

X The want of safe harbors, and the means of easy communication with the interior of the neighboring States was the reason of the slow progress of lake navigation until the year 1832, when, by the completion of the Welland Canal and the Ohio canals, and the improvement of the harbors on the shore of Lake Erie, opened further communication with the outer world, both to the south through the State of Ohio, and to the east for Lake Ontario. The Erie Canal had been opened through New York State since 1825. In 1836, there were on the lakes 45 passenger steam vessels, and in 1839 they had increased to 61 steam vessels. X The largest at this time was the "Illinois," built in 1838, whose dimensions were 205'x 29'x13', with an engine 56"x10' stroke, and running from Buffalo to Chicago. The largest then running to Detroit was the "Erie," built at Erie, Pa.—hull, 176'x27'x10', and having a beam engine of 52"x10' stroke, and her average speed about 12 miles per hour. X The cabin fare at this time between Buffalo and Detroit was \$8.00, including meals. The "Illinois" usually made the trip to Chicago in five days and return in four days to Buffalo. Cabin passage from Buffalo to Chicago, \$20; Detroit to Chicago, \$16. ✓ There were several small steam vessels devoted mainly to freighting, such as the "United States," 140'x28'x10', with a high-pressure engine, built at Pittsburg, Pa.; 28-inch cylinder by 7 feet stroke.

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On account of the number of vessels that had been constructed for a few years prior to 1840, being of a larger per cent. than the increase of passenger traffic and freight business, sharp competition had set in, and passenger rates were cut as low as \$4.00 to Detroit from Buffalo, extras included. This was not maintained for any length of time, but in June, 1839, an association was formed, comprising many of the principal owners of the lines on the lakes, the object of which was to regulate the number of vessels to retain in commission according to the needs of the business between Buffalo, Detroit and Chicago, and to retire from service all those found to be unnecessary, and at the same time to fix a regular tariff for passenger travel and freight rates that should prove more beneficial to the steamboat interests than those

previously in force. There were about thirty steam vessels represented in this association. This combination did not remain active for any great time.

The introduction of the propeller on the northern lakes was first inaugurated by the arrival on Lake Erie, early in 1842, of the "Vandalia," a sloop-rigged craft, built at Oswego, and of 150 tons. In 1842, the "Chicago" and the "Oswego," each of 150 tons, were built at Oswego. In 1843, the "Hercules" and the "Sampson," the former built at Buffalo, and the latter at Perrysburg, were the first built on Lake Erie. These propellers were thus referred to at that date: "The building of the propeller 'Hercules' is the commencement of a new era in steam navigation on the lakes, and her owners predict for that description of vessel a large share of the carrying trade, especially upon the upper lakes. The 'Hercules' is 137 feet long, 25 feet beam, 8 feet hold, and put together in the strongest manner. She has fourteen state rooms, six feet square, with sufficient additional space for the erection of 46 more berths, and from the peculiar symmetry of the 'Hercules' she will doubtless afford ample accommodations for families emigrating. Her space below for storage is large, having almost the entire hull of the vessel appropriated for that purpose. The peculiar feature, however, of the 'Hercules' is her engine and its auxiliaries. On examining the machinery, all are struck with the infinite compactness of the steam apparatus, and its perfect simplicity, the whole weighing but fifteen tons. The engine is simple and very small, lies close upon the keelson, and fills but a space of six feet square. It is one of Ericsson's patent, was made at Auburn, and is computed to be of fifty horse power.

"The weight of an engine and boilers for one of our largest steamers is estimated at from 60 to 70 tons, the dead weight of which a propeller escapes carrying. The paddles are made of boiler iron $\frac{3}{8}$ inches thick, 18 inches broad by 30 inches, and are placed on two long wrought-iron shafts protruding from either side of the stern post. The diameter of the paddles (screws?) are 6 feet 4 inches. From the superb manner in which the 'Hercules' is built and fitted out, having cost nearly \$20,000, it is apparent that the enterprising proprietors are determined to give the experiment a full and fair

trial. Another boat of the same tonnage, for the same owners, is now being built at Perrysburg, and will be out next month. Ten cords of wood, at a cost of \$17, will suffice the propeller per diem, while one of our largest steamers will consume two cords per hour, at a cost of \$80 per day. Some of the steamers even exceed this calculation by 33 per cent." These two propellers had each two high-pressure engines, with 14-inch cylinders and 28 inches stroke.

The propeller had taken a strong hold on the lakes at this early period, and many vessels were fitted with the screw propeller, and most all were driven by the high-pressure or non-condensing engine. Some of the larger ones about 1850 may be said to have been: "California," with two H. P. engines, 18"x34" and 8' wheel; "Delaware," one H. P. engine, 20"x42" and 7'6" wheel; "Globe" and "Goliath," each two H. P. engines, 16"x28"; "Manhattan," 140'x24'x10', with two H. P. engines, 16"x32", with an 8' wheel; "Oregon," 140'x23'x9'10, with two H. P. engines, 16"x28", and a 7' wheel.

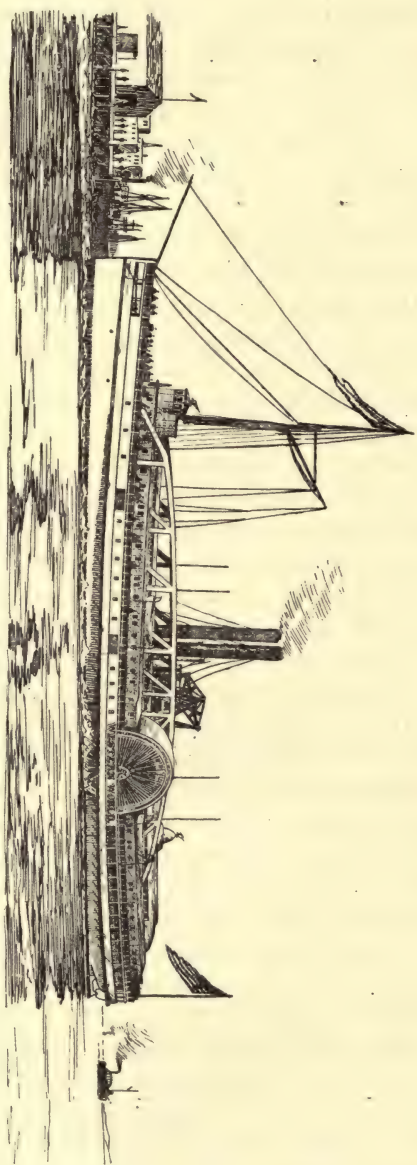
After 1855 screw propellers of increased size were built, and, proving themselves well adapted to the trade of the lakes, especially through the canal, they quickly began to take the place of the side-wheel boats. The year 1861 may be said to have been the beginning of the era for propellers on the lakes of 1,000 tons and over. Since then side-wheel boats are only used on some special passenger service.

The era of larger vessels began in 1844; with the construction of the "Empire," of 1,140 tons, 253'x32'8x14', with high-pressure engine of 45"x10', and two boilers, and water wheels 30'x11'. There was also the "America," running from Buffalo to Chicago, hull dimensions being 225'x34'x12'; draft, 8 feet, with two high-pressure engines, built by Yeatman & Shields, of Cincinnati, Ohio, each engine having cylinders 30" diameter by 11' stroke, and seven boilers, working under an average pressure of steam of 90 lbs., cutting off at 4' 2"; water wheels, 34'x10'6. The "Niagara," built at Buffalo in 1845, of 1,100 tons, 230'x33'6x14', with a beam engine, 65"x10', and three boilers, and water wheels, 30'x10'. These vessels were constructed for the passenger travel on Lake Erie and Lake Michigan. A few years later, others of increased dimensions were built, the largest being the "Empire State," built

at St. Clair, in 1848, of 1,570 tons, 310'x37'x14', with a beam engine of 76"x12', constructed by Merrick & Towne, Southwark Foundry, of Philadelphia, Pa., with water wheels of 38'x10'. At this time the railroads were being rapidly extended from the coast cities to the western States, and in 1851 the New York and Erie R. R. Company was largely interested and controlled a line of steamers comprising the "Niagara," the "Keystone State," and the "Queen City," running from Dunkirk to Detroit, connecting there with the railroad to the West. At this time the rivalry between the N. Y. and Erie R. R. Co., and what was subsequently the N. Y. Central R. R. Co., was about as intense as desired, especially for the western travel, that had largely increased in a few years.

Passenger travel by the way of Albany and Buffalo to the West was served on the lakes by a fine line of steamers, one of them being the "Mayflower," built in 1849 at Detroit, of 1,242 tons, 288'x35'x12', with a beam engine, built by the West Point Foundry, at Cold Spring, N. Y., of 72"x11', having three boilers below decks and two chimneys; water wheels, 35'x11'. This vessel was finally wrecked on Point Au Pellee, in November, 1854, in a fog. In 1854, the Michigan Central R. R. Co. and Isaac Newton and others of New York City, who were interested in the People's line on the Hudson River, had built at Buffalo two large side-wheel steamers, the "Western World" and the "Plymouth Rock," to run in connection with the railroad from Albany to Buffalo—that was now the N. Y. Central R. R.—to make a through line from New York to the West of those having a mutual interest. The "Western World" was 337'x42'x14'6, and had a lever beam engine, built by the Allaire Works, of 81"x12' stroke. The "Plymouth Rock" was 335'10x42'x14'6, and had an engine of same type and size as the "Western World," and by same builder. These were the first vessels built by John Englis, of New York, after succeeding to the business of William Brown, of that city.

Another line that was running first to Munroe and then to Toledo, in connection with the railroad, from Buffalo, was formed of the "Empire State," the "Northern Indiana," and the "Southern Michigan," built in 1852, at Buffalo, N. Y., each being 300'x36'10x13'7, with beam engines, constructed by the Morgan Iron Works, of 72" by 12' stroke. The former, the



“WESTERN WORLD.”

"Northern Indiana," was destroyed by fire on the morning of July 17th, 1856, while on a trip from Buffalo to Toledo; 56 lives were lost. The "Empire State" having been laid aside, the "Western Metropolis," 321'x39'10x14'2, was built, in 1856, and fitted with the engine from the "Empire State." Then, in 1857, the "City of Buffalo" was constructed for the same line, being 331'x40'x15'8, also having a beam engine but 76" by 12' stroke.

From Buffalo to Cleveland there was also, in 1853, a line of large side-wheel steamboats, comprising the "Crescent City" and the "Queen of the West," both built at Buffalo in 1853. The former was 320'x39'6x14', with a beam engine of 80" cylinder by 12' stroke, built by the Morgan Iron Works. The "Queen of the West" was 324'x40'2x14'7, with same type of engine as her consort, by Henry R. Dunham & Co.

Again, in 1853, there was another line of these large side-wheel steamboats from Buffalo to Sandusky, the "Mississippi" and the "St. Lawrence," built also at Buffalo the same year. The former was 320'8x40'10x14', with a beam engine, built by I. P. Morris & Co., Port Richmond Iron Works, Philadelphia, Pa., having cylinder of 81 inches by 12 feet stroke. The "St. Lawrence" was 326'x40'x14', with same type of engine, but built by the Allaire Works.

The boilers for the "Southern Michigan," the "Northern Indiana," the "Crescent City," the "Queen of the West," and the "St. Lawrence," were constructed by the Shepherd Iron Works, at Buffalo, N. Y. These works were established in 1847.

These were all fine-modeled vessels, were handsomely furnished for the passenger travel on the lakes, and most of them had ample power of their engines to give them high speed. They were in external appearance like to the larger of the Long Island Sound boats of that day, with an increased depth of hold, as they more often met heavy weather than the eastern boats. Another feature in that they differed from the eastern type, but was shortly after adopted by the latter, was the extension of the joiner work on the forward main deck to the stem of the vessel. These vessels found their employment gone when the railroads bordering on the lake had made their connections, in 1857. They continued in some cases for a year

or so longer, but in the course of two years so much of the passenger travel had been absorbed by the railroads that it was no longer profitable to run them on their routes, and they gradually passed to other employment after their machinery had been removed. The hull of the "Western World" was used for a floating dry dock at Cleveland, Ohio, that of the "Mississippi" was used for a similar purpose at the same city; also one at Buffalo, N. Y., and another at Erie, Pa. The "St. Lawrence" was altered to a barge, the "City of Buffalo" to a propeller, and the "Western Metropolis" converted to a bark. To such base uses had a fine fleet of steamboats come while yet in serviceable condition. The engines of these vessels subsequently were sent to the Atlantic coast. James Raynor, the promoter of the Star line to New Orleans, securing three of them, that of the "Mississippi," for the "Guiding Star"; that from the "Crescent City" for the "Morning Star," and that from the "Queen of the West" for the "Evening Star." The engine from the "St. Lawrence" was placed in the "Foh-Kien," at New York; the "Southern Michigan," in the "Thomas Cornell," on the Hudson River; that from the "Western World" to the "Fire Queen," while that from the "City of Buffalo" went into the "Morro Castle," and the "Plymouth Rock" to steamer "Plymouth Rock," for China waters, and from the "Western Metropolis" to steamship "Western Metropolis," on Atlantic coast, and built at Brooklyn in 1863.

In 1856, there were on all the Northern lakes 107 side-wheel steamboats and 135 propellers, and 1,006 sailing vessels, none smaller than schooner rigged. This was a large increase in five years.

The first compound engine on the lakes was in the "Oregon," built in 1846; hull, 200'x28'6x—, with a pair of compound engines, built at Pittsburg, Pa., of the "Clipper" type, western-river style, having cylinders 24 inches and 48 inches by 9 feet stroke each, with six boilers, and water wheels 28'x10'. This vessel was destroyed by fire at Chicago in 1849. The next was the "Buckeye State," built in 1850, and run from Buffalo to Cleveland. Hull was 282'x32'x13'; engine, annular cylinder, compound beam; small cylinder, 37 inches diameter; large cylinder, 80 inches diameter, with a stroke of 11 feet. Steam was furnished by three flue-return tubular boilers. In-

itial steam pressure in high-pressure cylinder was 50 lbs. Machinery was built at the Allaire Works, New York City, from designs of John Baird and Erastus W. Smith, engineers. Water wheels, 35'x9'3.

It was on Lake Erie where the compound propeller engine for the merchant service in this country first took form. This does not include the yacht "Octavia." The first engines were those altered from simple condensing engines by the addition of a small cylinder, in 1867, under the Perry & Lay patent. The first new engine of that type built was placed in the "Jay Gould," in 1869. These were "Steeple" compounds. The first fore and aft compound engine on the lakes was placed by the Globe Iron Works, of Cleveland, Ohio, in the propeller "Egyptian," built at Black River, Ohio, in 1873. The King Iron Works, of Buffalo, N. Y., in 1875, built one of the same type for the yacht "Orizaba," that is still in commission. The pioneers of the triple-expansion type of engine on the lakes were those in the "Cambria," built by the Globe Iron Works Company, and the "Roumania," built by S. F. Hodge & Co., at Detroit, Michigan, both completed in 1887. For the quadruple-expansion type, two came out in 1894, the "Northwest," by the Globe Iron Works Company, and the "Unique," by the Frontier Iron Works, of Detroit, Michigan.

Capt. Harry Whitaker, of Buffalo, N. Y., obtained a patent October 18th, 1853, for the "direct application of the crank outside the hull to side-screw propellers . . . combined with high-pressure engine." The first application under this patent was in 1855, to the side-wheel steamer "Baltic," whose hull was 221'x30'x12' depth of hold, with originally a high-pressure engine, 35-inch cylinder by 8 feet stroke. In the place of this engine there were a pair of high-pressure engines of 26 inches by 36 inches, fitted on each side of the vessel, to drive a screw propeller of about 13 feet diameter. In 1856, Arthur Edwards, the owner of the vessel, wrote to the designer of the machinery, in part: "She has not broken her machinery nor met with any accident during the whole time of two seasons. She now carries double the freight and runs with less than half the fuel, and at a much higher rate of speed. Notwithstanding her present engines rate 60 per cent. less power than her former engine, she now runs with 45 lbs. pressure of steam

instead of 90 lbs. usually worked in her paddle-wheel engine. . . . The application of side propellers gives great deck room for carrying deck load, and stability to the boat that is not obtained by any other means of propulsion. She has not damaged freight to the amount of one dollar for the last two seasons, yet she has experienced some of the heaviest gales upon our lakes with heavy deck loads of freight and live stock." An engineer who was on the lakes at the time and knew the "Baltic" and her machinery very well, says: "The 'Baltic' was a freighter; when running light was very fast, and when loaded was very slow." This would seem to be the results obtained in all four applications of this mode of propulsion. The next experiment along this line was on the "Eureka," or "Charlotte Vanderbilt," that run on the Saugerties route on the Hudson River, and given on another page.

In 1864, Wright & Whitaker constructed the "Com. Perry" for the Revenue Marine Service on the lakes. The vessel was 166'x23'6x10', with a draft of 6'6". There were two engines to each propeller wheel of 18 inches diameter and 24 inches stroke each, and located about 12 feet apart. The two propellers were each 13 feet diameter and one-third submerged. Steam was furnished by two Whitaker drop tube vertical boilers, 18'x9', intended for a steam pressure of 90 pounds. One of the engineers who was on the vessel says: "When any sea was on one could not stand watch in the engine room on account of the sea swashing over everything in the room, coming in by the way of the holes left for the cylinders and running out the lattice floor. Our ordinary cruising speed was 9 knots, yet I have driven her at a rate of 14 knots and 16 knots, but at the expense of a large consumption of fuel. The boilers were worked under a pressure of 120 lbs. to 150 lbs. steam at times. The vessel was thought only fit for a mill pond, as the operation of the engines was anything but comfortable." The noise from the four exhaust pipes with the four short exhausts from the engines was similar to the noise from the machinery of a saw mill. The vessel did some good service on the lakes, and was finally placed out of commission about 1880.

The steamboat "Water Witch," built in 1861, hull dimensions, 170'x26'x—, had a beam-propeller engine geared to the propeller shaft, fitted in the vessel by the Detroit Locomotive

Works. Wheel was 9' diameter by 18' pitch, making 75 to 80 revolutions. The vessel was lost, in 1863, on Lake Huron. There had been four or five of this same type of engines built at New York just prior to this date.

The Detroit and Cleveland Steam Navigation Company operated two high-pressure steamboats in 1850, named "South-erner" and "Baltimore," for two years. The former was 170'x 27'10"x11'6, with an engine of 27 inches cylinder by 8 feet stroke, and five boilers; and the latter was 169'x26'x11'4, with an engine of 24 inches cylinder by 8 feet stroke, and five boilers. During 1852, other interests had the "Forest City" built for the route, of about the same size as the former vessels. The same year the "St. Louis" and the "Samuel Ward" were added to the service. The former was 185'x27'x12'6, with a low-pressure engine, 44-inch cylinder by 9 feet stroke, and the latter 173'x25'6"x9'4, with an engine of 40"x10' stroke. The "Cleveland," built in 1852, was added the same year, being 180'x28'x11'8, with an engine 50"x10'. The "May Queen," built in 1853, and the "Cleveland," were the only steamboats operated on this line until 1855, when the "Ocean" was added. From 1856 to 1862 the "May Queen" and the "Ocean" filled the service between the two cities, and from 1864 to 1867, the "City of Cleveland" and the "Morning Star" were on the route, and from 1867 the "R. N. Rice," built that year, run with the "Northwest" until 1868, when the Detroit Steamboat Company was incorporated, and the same steamers run until 1877, when the "R. N. Rice" was partially burned. The same year the company had built by Kirby Bros. their first iron-hull vessel, the "City of Detroit No. 1," the hull being 250'x36'x14'6, with a beam engine 62"x11' stroke, and, with the "Northwest," filled this route until 1883. The "City of Cleveland" was built in 1880, a duplicate of "Detroit No. 1," and run on the Mackinac route until the "City of Mackinac" was completed, in 1883. This vessel run one year, and her engine was then "compounded" by W. & A. Fletcher Co., of New York, by the adding of a high-pressure cylinder just in the rear of low-pressure cylinder, and connected through its piston to same end of the beam. In 1889, the "City of Detroit No. 2" was constructed of steel, being the largest of the fleet at that time, and with all the improvements. Since then there has been added "City

of Alpena," and "City of Mackinac," both constructed in 1893, at Wyandotte, Mich., of steel, having compound beam engines and costing over \$300,000 each. These were built to take the place of steamers of the same name that were sold to the Cleveland and Buffalo Transit Co.

They were not so progressive in the introduction of iron-hull vessels on the lakes as they were on the Atlantic coast, for it was not until 1861 that David Bell, of Buffalo, N. Y., constructed the screw steamer "Merchant," for Lake Erie service. This industry did not show any healthy growth until 1871, when the King Iron Works, the successors of the Shepherd Iron Works, built four screw steamers for the Anchor line, and about the same time the Wyandotte yard, of the Detroit Dry Dock Co., built the "E. B. Ward." Since 1890, iron ship building on Lake Erie and Lake Michigan has made marvelous strides, and some of the vessels constructed there in the last few years have been for Atlantic coast service, being sent through the canal to the coast, some cases in sections, and have proved a credit to their builders.

On Lake Ontario a grant was obtained in 1815 from the representatives of Robert Fulton and his associates, who held the exclusive right, under the legislative grant, to steamboat navigation on the waters of the State of New York, for the right to navigate this body of water.

The "Ontario" was built at Sacketts Harbor, N. Y., in 1816, and commenced to run between Ogdensburg and Lewiston early in the season of the next year. The vessel was 112 feet long, 28 feet beam, and 8 feet 3 inches depth of hold. She was fitted with masts and sails as vessels of that period. The engine was a lever beam built by Daniel Dod, at Elizabethtown, N. J., having a 34-inch cylinder and 4 feet stroke, the castings being furnished by Robert McQueen, of New York City. Steam was furnished by two single-flue boilers. After the original engine had done service for twelve years, it was removed, and one built by S. Sexton, low-pressure, of 28 H. P. substituted. The vessel was broken up about 1835.

The "Sophia" was built the year after the "Ontario." The boat was smaller than her predecessor, being of but 50 tons—67'8 long by 18'2 by 4'7 hold, and was built at Sacketts Harbor,

by A. S. Roberts for E. Camp & Co., the owners of the "Ontario"; had a low-pressure engine, built by James P. Allaire, of New York. The next steam vessel was the "Martha Ogden," of 49 tons; was built at Sacketts Harbor, in 1823, by A. S. Roberts, for L. Ogden & Co., and was 74'3x17'10x4'2 depth of hold. Was also fitted with one of James P. Allaire's low-pressure engines, of 22 H. P. This steamboat continued in service until 1832, when she went ashore and was lost for further use. In 1831 the "Brownville" was built for D. Griffen & Co.; was 85'10x20'x7'4 and fitted with a low-pressure engine. In the same year the "Charles Carroll" was built at Sacketts Harbor, by C. Case, for the same parties as owned the "Brownville," and was 81'8x14'6x6'3 hold; was fitted with a low-pressure engine, built by J. Dod. In the next year the "William Avery" was also built at Sacketts Harbor, by the same builder, and for the same parties as the preceding vessels, and was 131'x21'x7'4; was fitted with a low-pressure engine. All these vessels were used to ply to and from Sacketts Harbor and the lake ports.

The "United States" was built at Oswegatchie, in 1831, by William Capes, for the "Ontario and St. Lawrence Steamboat Co." Was 143'x26'7x11', and was fitted with a low-pressure engine, 40-inch cylinder by 8 feet stroke, built by W. Avery & Co. This vessel continued in service until 1843, when it was broken up at Oswego, her engine being put in the "Rochester." This vessel was not used on the St. Lawrence River after the "Patriot War," of 1837, as she took a part in that affair, and having become obnoxious to the Canadians, it was considered not advisable to use her on that part of the route. This company was incorporated by the New York legislature in January, 1831, with a capital of \$100,000, and the "United States" was their first vessel, and for size and accommodations far surpassed anything that had previously been in service on Lake Ontario. In 1833 the "Black Hawk" was built, at French Creek, by G. S. Weeks, for William Baker & Co., for use on the St. Lawrence River. This vessel was 106'x18'x17', and was fitted with a low-pressure engine of 30 H. P. The "Oswego," for Lake Ontario service, was built in 1833, at Oswego; was 143'x20'x7'8. Her low-pressure engine, built by Avery & Co., was transferred in 1839 to the

"St. Lawrence." In 1835 the "Oneida" was built at Oswego. Was 132'x19'x9'. Had a low-pressure engine, and was commanded by one of her owners. Some years later she was on Lake Erie, where she was finally lost. There was also on the river the "Telegraph," of 131'x18'9"x8'. Was converted into a sailing vessel and destroyed by fire on Lake St. Clair. There was a small boat of 68 feet long, built for Black Lake, named "Rossie," having a high-pressure engine built by Starbuck & Son, Troy, N. Y.

In 1839 the "St. Lawrence" was built at Oswego, N. Y., and in 1844 the vessel was rebuilt and lengthened to 180 feet long by 23 feet, and about 11 feet deep, and run about five years, and was laid up at Clayton, N. Y., in 1850. The engine came out of the "Oswego." In 1842 the American line, on Lake Ontario, running from Lewiston to Ogdensburg, stopping at Toronto and Kingston, on the Canadian shore, and at Rochester, Oswego, and Sacketts Harbor on the American shore, had four steamboats in operation, the "Rochester," that was 158'x27'x11', with high-pressure engine, 28"x8'; "Lady of the Lake," of about the same size; the "Oneida," of 1835, and the "St. Lawrence." The time consumed by the trip from Ogdensburg to Lewiston was 24 to 26 hours.

In 1849 the U. S. Mail line, or American Steamboat Co., and in 1859 the Ontario Steamboat Company had the "Northerner," the "Ontario," and the "Bay State." The "Ontario" was 222'x32'x12', with a beam engine 50"x11'. The "Northerner" was 200'x37'x12', with a beam engine 60 inches by 11 feet; and "Bay State," 200'x27'x10', beam engine 40"x11'. The "New York" was added in 1852, being 223'x33'x12', with beam engine 60 inches by 12 feet. The building of railroads along the lake destroyed the business of this line in the same way, and about the same time—a few years later—as it caused the withdrawal from active service of those large side-wheelers on Lake Erie, but with this difference: while the latter had their engines removed and mostly sent to New York City, to be used in other vessels, the former had an outlet with the vessels intact by running the rapids of the St. Lawrence to the Atlantic coast, and thence to an American port. In 1860 the "New York" and the "Northerner," and in 1863 the "Suffolk" x "Bay State," and in 1865 the "Ontario," were all

brought safely to ports on the Atlantic coast. The "New York" saw considerable service on the New England coast and on the Delaware River and bay, and was laid aside from further service about 1893. The "Ontario" and the "Bay State" were sold for foreign service about 1867. Most of these engines were built at the Morgan Iron Works, New York City. Some months prior to the "New York" running the rapids, in 1860—in June, 1858—there were two Canadian-built side-wheel steamboats that were larger than the "New York," each being 298'x30'x9', that ran the rapids and came to New York. They were named originally "America" and "Canada." There was American capital invested in their building, by the Great Western R. R. Co. They had beam engines, of 70"x12', constructed by H. R. Dunham & Co. After they arrived in New York they were altered for coast service—for they were much like our Long Island Sound steamboats—by cutting off part of their guards to three feet in width, and building up the structure on the main deck more solid and firmly, and adding heavy hog frames for the vessel to withstand the severe weather encountered on the coast. One vessel was chartered to the Quartermaster's Bureau, to transport troops, and the name changed to "Coatzacoalcas," and it has been an enigma how this vessel, so ill-adapted to the work, could have gone through the many trying situations in which she was often placed, without greater damage than she received. A special Act of Congress was obtained to allow her an American register. Her charters to the government run from March 16th, 1861, to September 17th, 1862, at from \$1,100 to \$1,400 per day. After the vessel was placed on the Nicaragua route, where she remained until 1866, her name having been changed to the original one of "America," the vessel was rebuilt, her bottom being planked over the original hull, and strengthening the bulkheads and hull in general. She was then sent around to the Pacific Ocean, and came near being lost on the voyage, but was finally lost by fire while lying in the harbor of San Juan del Sur, Nicaragua, on April 11, 1869. The "Canada" was purchased by Hargous & Co., renamed the "Mississippi," run

on their Tehuantepec route from New Orleans for a year or more, and history seems to have swallowed up her record after this, though it is thought she was sold for service in South American waters, from Panama to Valparaiso. Marshall O. Roberts, of New York, was interested in these vessels.

An account is thus given of the "America" and the "Canada" running the rapids of the St. Lawrence. "The fine steamers 'Canada' and 'America' have been brought safely down the rapids of the St. Lawrence to the ocean. They cost half a million dollars, and were found to be worth nothing above the rapids. In passing down the rapids they made some leaps seven or eight feet in height. For vessels 300 feet long and 6 or 8 feet draft, this was regarded as a neck or nothing experiment. The first rapids—the Long Sault—are seven miles long and extremely rough, the boiling water heaving up from 8 to 12 feet high in places, and dashing about the rocks like the ocean in a violent storm. This passage was made in fifteen minutes. The rapids of Split Rock were next in the way. Here it was necessary to make a curve almost at right angles within a space only two-thirds the length of the same. The pilot, in the Long Sault rapids, with the dexterity of a skilful player at billiards making his carom, let the bow of the boat strike a rock forcibly on her starboard side, thereby throwing her stern into the center of the channel by the only practical method, and permitting her to pass through in safety. Next the Cedar rapids were reached. They were passed at the same rate, the boat striking alike aft and forward, but no substantial injury was obtained. The Lachine rapids, near Montreal, were the next. Here the 'Canada' again struck. The rocks here are exceedingly bold and present a rough and ragged surface, but were passed in safety, and in a short time the vessel and her bold mariners glided placidly and exultingly through the abutments of the Victoria bridge."

There was no further running of these rapids by American vessels, or those for use on our coast, until June, 1891, when the whaleback "Colby" shot the rapids of the St. Lawrence, on her way from Duluth, Minn., to the Atlantic coast. This vessel

was 256'x36'x22', and drew 6' 9" aft and 5' 6" forward. The first running of these rapids by American steamers was by two revenue cutters, about 1848 or 1850, named the "Jefferson" and the "Dallas." How it was done will be found in the next volume, under the head of "Iron Shipbuilding."

Since 1870 more than one attempt has been made to establish an American line on the St. Lawrence River for the summer travel exclusively, but they have all ended in a failure to succeed.



CHAPTER VII.

COAST OF MAINE



It was not until July 7th, 1823, about sixteen years after the successful introduction of steam vessels in this country, that the "Patent," the first regular steamboat in this section of the United States, arrived at Portland, Maine. At this date about one hundred were in service on the Western rivers, and an equal number had been constructed on the Atlantic coast. On May 22d of the following year the "Maine" arrived at Belfast. This vessel is generally described as consisting of the hulls of two schooners, with a water wheel in space between the hulls, and beams laid across and decked over.

X The Kennebec Steam Navigation Company was organized in 1823, and the same year they bought the "Patent" and put her on the line between Boston, Portland and Belfast. The vessel was about 100 feet long, built at New York in 1823, and had her machinery fitted on board by Daniel Dod, who was one of the early builders of marine engines at New York and the vicinity. He had built a copper boiler for this vessel, to be worked under what was considered high-pressure steam at the time, but on a trial of the machinery on May 9th, 1823, the boiler being of an imperfect design for the pressure, the front head was blown out and five persons killed and two injured, among the former being the constructor of the machinery. X He had also built, a few years previous, the boilers for the "Savannah," the first steamship to cross the Atlantic Ocean. The "Patent" was running on the Penobscot River as late as 1835. The company, in 1826, bought the "Legislator," that was in New York waters. This vessel was 112'x23'x7', with a square engine, built in New York in 1825, and had fallen from favor by the explosion of her boiler in the same year, while lying at her wharf, being prepared for a race with an opposition boat. This vessel run for two years when the business of the company

was closed up and the vessel was taken back to New York waters. The two vessels were sold at auction in Boston February, 1828.

In May, 1824, there was a small steam brig named the "New York" said to have been a sailing vessel for a very short time, and power added afterwards. This is doubtful. This vessel had been in use between New York and Norfolk, Va., and at the date named was the property of Mr. Bartlett, of Eastport, and running on the coast of Maine. The vessel was built in 1822, at Norfolk, Va., by W. A. Hunter, for George, William C., and N. S. Rowland, and others. Shortly after coming on the Maine coast, and while on a trip from Bath, and in the vicinity of Owl's Head, it collided with the "Patent," but the damage being slight, both proceeded on their way. The "New York," when eight miles to the eastward of Petit Menan light, was discovered to be on fire. There were over thirty persons in all on board, they being saved by the boats, but the vessel proved a total loss. The loss of this vessel was caused from the want of proper protection to the woodwork in the vicinity of the boiler and the want of fire buckets. This occurred on August 20th, 1826.

X The "Connecticut" and the "Chancellor Livingston," after being withdrawn from the New York and Providence route, in 1829 and 1833 respectively, being succeeded by more modern and powerful steamboats, were brought to this coast. X They were "old timers" even at that date, and it would appear they were the pioneers of the Boston & Portland line. The hull of the latter was broken up or dismantled in 1835, and her engine transferred to a new hull that had been built by Nathan Dyer, Jr., of Portland, for the Cumberland Steam Navigation Company, to run between Boston and Portland. The new vessel was named the "Portland," and was 163'x27'x10'7", with a square engine, 56-inch cylinder and 6 feet stroke. For a portion of the time the veteran steamboat owner of Portland, Capt. John B. Coyle, was engineer of this vessel. She was considered at this time something superior to any steam vessel that had been on the coast of Maine. As late as 1850, this vessel was in service on the coast.

In 1835 the "New England," that had been on the New York and Hartford route, was purchased by a company formed

at Gardiner, Me., and placed on the route to the Kennebec River, where she ran until May 31st, 1838, when she was lost by collision with a schooner when fifteen miles east-south-east of Boon Island. This vessel was certainly unfortunate, for she left the Hartford route with a bad name, for both of her boilers exploded at one time, on October 9th, 1833, before the vessel was one year old, killing and scalding several persons. The "Huntress" took her place to Kennebec River points.

During these early days of steam navigation, many of the steamboats ran on a route but a short time, either for want of sufficient capital to "grow up with the country," or to stand a strong competition. Besides the extension of the railroads on the coast of Maine caused an inroad on the business of the steamboats, making necessary a change of terminus at times.

It has been many times credited to Capt. J. B. Coyle of the invention of a fan blower to be applied to a boiler in burning anthracite coal, and that the application as made on the "Portland" was the first case where anthracite coal was used successfully for marine purposes. Capt. Coyle, in a letter to the author, many years ago, on the subject, says: "The idea of a fan blower was not original with me, for I had known of its previous application; but the power was obtained from gears on the main shaft, and, owing to the irregularity of the motion, the awkwardness of such an arrangement made it of little use." He also drove the blowers by a belt from a drum on the main shaft. They were able to burn the coal, but with indifferent success. The blowers for the "Portland" were made by John Sparrow, of Portland, Maine.

The "McDonough," that had formerly run to Hartford, Conn., from New York, was sent around to Portland in the spring of 1834, where she remained until 1836, when she was withdrawn for a time, but returned again in 1838. Capt. J. B. Coyle was engineer of the "McDonough" in 1834. This vessel became the property of the Cumberland Steam Navigation Company, but only remained here a few years. Her length was 146 feet; "square" engine; built in 1826.

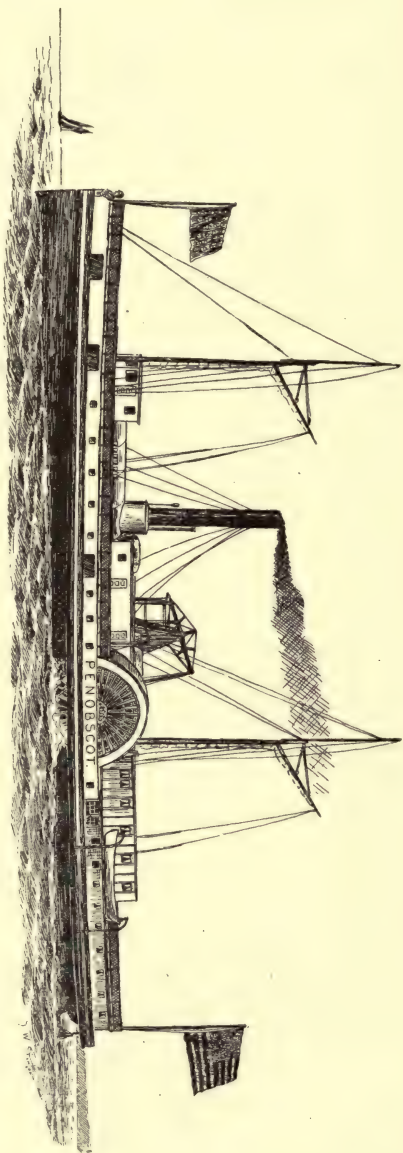
Commodore Vanderbilt appears to have taken an interest in the transportation facilities in this section of the country in 1837, for he placed the "Augusta" on the Boston and Portland route. She remained for a short time only, as there were

better boats on the regular line. A few months later "C. Vanderbilt," his crack boat from the New York route, was brought around to subdue the natives. This boat was 175'x24'x9', with a beam engine of 41"x10'. He found his match very closely in the "Huntress," she being 172'x23'x9'6", with beam engine 36"x12', while running for several months to Hallowell. The same company who owned and run the "Huntress" purchased the "J. W. Richmond"—that had been on the Stonington line on Long Island Sound, and a thorn in the side of Com. Vanderbilt, for she was a successful rival to his "Lexington" on the opposition line—in March, 1840, for \$52,500, for their Kennebec River route. This vessel ran with the "Huntress" until September 30th, 1843, when she was burned at her dock at Hallowell. Her dimensions were 202'x24'x10', with a "square" engine of 48 inches by 11 feet stroke. This was without doubt the largest and most able steamboat on the coast of Maine to that period. All of the passenger boats along the coast at this early date were open on the forward main deck, and, like our river boats, the height between decks was no greater than was deemed necessary. Our dwellings at that date had low ceilings, and the steamboats had little headroom.

From 1844 to 1846 there appears to have been plenty of excitement to the Kennebec River, via Portland, for the People's line was opened with the "John Marshall," a new boat built in Baltimore, Md., that ended in a consolidation of all the interests.

Memnon Sanford, who had become considerable of a factor in the steam navigation interests at this period on the coast, was at an early date interested in the Connecticut River Steamboat Company, and their first vessel of any size being the "New England," built in 1833, succeeded by the "Bunker Hill" and the "Charter Oak," the two latter being taken to the Maine coast about 1844. Capt. M. Sanford commanded the "Charter Oak," and Capt. T. B. Sanford the "Bunker Hill," while on the Hartford line. From this transfer of location began what subsequently became the Sanford line. He may have been interested in the change of the "McDonough" from the Hartford line to the Maine coast prior to the "New England" being purchased. The former vessels were succeeded by the "Kennebec" and the "Penobscot," and later by the "Admiral" and the

“PENOBSCOT,” OF 1844.



"Boston." The "Admiral" was put in service June, 1847, in place of the "Portland." The business at this date was in a stage of development consequent partly upon the extension of the railroads along the coast, and the rapid settlement of that part of the State. Besides, the transportation business by water was controlled by men of larger means financially. It took a few years for matters to permanently settle to a change of routes. There were a few opposition lines from 1850 to 1860 to the Kennebec River towns, but they did not last after the demand by the Navy Department and the Army Department for vessels at the outbreak of the war.

There was a very good boat running to the Kennebec River from 1849 to 1854 named the "Ocean." Her dimensions were 220'x28'x11', with a beam engine of 48 inches by 11 feet. This vessel was destroyed by fire in lower Boston Harbor, on November 24th, 1854, by collision with the Cunard steamship "Canada," by which the stoves and lights were upset and the vessel set on fire and burned to the water's edge. Five passengers lost their lives in this accident. There were more than 100 passengers saved by the "Forest City," the "Boston," and the "Eastern State," that were in the vicinity at the time. The former was then running to Portland and the "Boston" to Bangor. The "Ocean" was at this time owned by R. K. Page, of Hallowell, Nathaniel Kimball, and the owners of the "John Marshall." The "Eastern Queen" subsequently run on this line.

In 1854 Samuel Sneed, of Brooklyn, N. Y., built for the Maine Steam Navigation Company, for the Portland and Bangor service, the "Daniel Webster." She is reported to have been better fitted and furnished for the passenger travel than any steamboat then on the Maine coast. Her dimensions were 240'x34'x11' with a beam engine 52 inches by 11 feet stroke. There was also at the same time the "Eastern City" built in 1852, on the coast and occasionally to Bangor. The latter was a few feet shorter, with much less power than the "Daniel Webster." They both run here until the war broke out. The "Eastern City" was purchased by the War Department November 27th, 1861, for the sum of \$50,000, and name changed to "Cossack." The vessel was at Baltimore at a much later period, having been sold by the government, and afterwards on the

Maine coast, and at a later date was sold for service in Canadian waters. The "Daniel Webster" had four charters with the War Department, each lasting about six months, the first two charters being at \$600 per day and the last two charters at \$300 per day. Is it any surprise that there was a large bonded debt after the war, with such prices paid by the government? The Webster's name was changed to "Expounder" while in the war service. Some years ago she was sold for service on the St. Lawrence River, and her name changed to "Saguenay."

There was a small steamboat that run on the coast from various points, built at New York, in 1846, about 130 feet long, and named "T. F. Secor," from 1848 to 1862, when chartered by the government. She was burned at Hilton Head, May, 1863.

The Portland Steam Packet Company was first made an organized company in 1843, after passing through many changes. The first steamer was a screw propeller constructed at Portland, and named the "Commodore Preble." This vessel was about 150'x24'x8' deep, and run alternate days between Portland and Boston, when the next year the company had built another propeller slightly larger than the first and named the "General Warren," for the same service. These vessels had each a pair of high-pressure engines, the "Preble" having cylinders of 17 inches diameter and 24 inches stroke, and the "Warren" 18 inches diameter and 24 inches stroke. Each vessel was fitted with a propeller 7 feet in diameter. These vessels were fitted more with regard to freight transportation, so the passenger accommodations were very limited. It was soon found necessary to have vessels of a different character for this route, and accordingly the "John Marshall" was purchased in 1847, and for a few years run on the route with the propellers. The company finding their business increasing so rapidly had constructed for them, in 1850, the "St. Lawrence," and, two years later, the "Atlantic" was built, when the "John Marshall" and the propellers were disposed of, leaving the two new boats to serve the business of the route. These vessels were each 216'x28'x10', with engines of 40" by 10', not large power for such size vessels on such a route. The "Forest City" was built in 1854, and the "Lewiston" in 1856, and the "Mont-

real" in 1857. These boats were about 235 feet long and 33 feet beam, with engines 52"x11' stroke. The "Lewiston" was sold to the P. B. & M. S. Co., while the "Montreal" was burned at her wharf, August 9th, 1873. About 1865 the "John Brooks" was purchased in New York, having formerly run on the New York and Bridgeport route, and served the company well until about 1890, when she was laid aside. Since then the company have added the "Tremont," in 1883; the "Portland," built at Bath, in 1890; the "Bay State," built at Bath in 1895, and their first steel-hull propeller, the "Gov. Dingley," in 1900, built at Chester, Pa. The "Tremont" was sold to the Joy Line in 1900, and the "Portland" was lost in the vicinity of Cape Cod, it is thought, on November 27th, 1898, where every soul on board was lost.

The best time that has been made between Boston and Portland has been made by the "Gov. Dingley." Between Boston and Portland, on February 7th, 1900, in 6 hours and 18 minutes; between Boston and Portland, on March 22d, 1900, in 6 hours and 18 minutes; and between Portland and Boston, on July 1st, 1900, in 5 hours and 55 minutes, with fresh head wind, and four boilers. Average time, with three boilers, 7 hours and 30 minutes.

After the "Daniel Webster" and the "Eastern City" had been withdrawn, the Kennebec Steamboat Company had built the "Star of the East" in 1866, at New York, for the Boston and Kennebec River route, and was the only steamboat on the route until the "Kennebec" was built in 1889. The former vessel's name was changed to "Sagadahoc" about 1890. In 1896 the company, thinking a steamboat would eventually pay to run during the winter season, the next year had constructed the propeller "Lincoln," and run her one or more seasons, when she was sold to parties who run her in Florida waters for a time, but has since been disposed of and run on several routes.

All of the lines running from Boston to the coast of Maine were consolidated in November, 1901.

X In 1833 the Boston & Bangor S. S. Co. was formed, principally of Boston people, and the next year the "Bangor" was built for them, by Bell & Brown, of New York, the vessel being about 160 feet long, with a "square" engine of 36 inches by 9 feet stroke. This vessel formed the permanent line between

Boston and Bangor, and the towns on the Penobscot River, until 1842, when R. K. Page & Son, of Hallowell, sent her to the Mediterranean, leaving Boston, Mass., on August 16th, 1842, for Gibraltar and Constantinople, and doing service in Turkey waters for many years. The same parties, in 1844, had built, at Bath, Maine, the hull of a propeller, 144 feet long, named "Marmora," with Ericsson engines, built at New York, that was also sent to the Mediterranean ports, leaving New York for Liverpool September 2d, 1845. This vessel was wrecked on the coast of Morocco on her outward voyage.

In order to correct many statements that have been made in the last few years that the "Bangor" was still in service, the writer submits a copy of a letter from the Consul General at Constantinople:

CONSTANTINOPLE, Nov. 12, 1902.

J. H. MORRISON, ESQ., 358 Hancock St., Brooklyn, N. Y.

DEAR SIR,—I have secured the following information regarding the American-built steamer "Bangor," which came out here in the year 1842.

She was purchased by the Civil List, re-named the "Sudaver," and used to carry passengers between this city and the Princes' Islands, in the Sea of Marmora. She was said to be the most commodious and comfortable daily passenger steamer. She was never the yacht of any Sultan. Her machinery is said to have been remarkable and original, and was named by the public "Rokana" (carpenter's plane), owing to its peculiar movements.

After many years' continual service to the Princes' Islands and the Sea of Marmora, during which time she underwent extensive repairs to her hull and boiler, she was transferred to the Idarei Feraide Co. She was laid up for several years in the Imperial Ottoman Dockyards after being withdrawn from service, and eventually, some fourteen years ago, was broken up.

The above information you can take as being authentic. It was secured through our harbor master from Husni Pacha, Chief Naval Constructor, Imperial Ottoman Admiralty, who remembers his trips when a

boy by the said steamer between his home in town and the Naval College at Halki, one of the Princes' Islands.

Very truly yours,

WM. SMITH LYTE,
Vice and Deputy Consul General.

There was an iron-hull propeller built by the Betts Harlan & Hollingsworth Co. for the Bangor Steam Navigation Co., named "Bangor," that ran between Boston and Bangor for part of the years 1845 and 1846. The vessel was begun in 1843, but not completed until August 1st, 1845, when she left the builders' hands for the home port, via New York. This was the first iron-hull steam vessel in the United States built for coasting service. Mr. E. C. Hyde was one of the owners of the vessel and agent of the company. The vessel was commanded by Capt. A. Parker, and the chief engineer was Henry Dockery. It was not long after being placed on the route that she was in trouble. She sailed on her second trip from Boston on August 31st, 1845, with 34 passengers and freight valued at \$20,000. The next day—Sunday—about 4 P. M., the vessel being then in Penobscot Bay, the after bulkhead of the boiler-room was found to be on fire, and the flames spread with such rapidity that it was found necessary to run the vessel ashore on Long Island, town of Islesborough, in Pendleton harbor, about seven miles from Castine. The passengers and crew were all gotten ashore on the island, with safety, and afterwards taken to Castine by the revenue cutter "Veto" and schooner "Pembroke," that had been lying in that harbor and went at once to their assistance. The vessel was afterwards decided to be a wreck, the insurance on the vessel adjusted, and the damaged hull towed to Bath, where it was repaired and rebuilt for service again. She afterwards ran on the same route until purchased by the Navy Department, in December, 1846, at a cost of \$28,975, was fitted with three guns for service during the Mexican war. Her name was then changed to "Scourge." After two years of war duty, the vessel was sold to parties in Lafayette, La., for \$2,300. After this transfer, all trace of the vessel seems to have been lost. Her dimensions were 120'x23'x9'. The motive power was a pair of twin-screw

engines, with cylinders of 22 inches by 24 inches stroke. Propeller wheels each 8½ feet diameter.

It was about the same time that James Cunningham, of New York, who had been interested with Memenon Sanford in steam navigation on the Long Island Sound, built the "Penobscot" for the Bangor route, and Capt. Sanford brought around the "Charter Oak" and the "Bunker Hill," that at times ran to the Penobscot River. The "Charter Oak" had a very narrow escape not long after, in July, 1845, while running in a dense fog on a trip to Bangor. The vessel had been held over at Portland on account of the thick weather until daylight, when they resumed the trip. The vessel was run very cautiously and with great care until approaching Monhegan, when the vessel was "slowed down" for the officers to find their location, and, before they were aware of the danger, had drifted on the rocks known as the "Old Man's Ledge," where they remained for about half an hour and on a falling tide, but with good fortune the vessel came off without any injury. The "Penobscot" was subsequently controlled or purchased by the regular line, and in 1845 Captain Sanford transferred the vessel to the Bangor route, and the first trip of the vessel on the new line was made in June, 1845, from Boston to Bangor, by the outside route, direct for Monhegan, this route having never been attempted before by a steamer sailing on "time and courses." The "Kennebec" was also added about the same time. The "State of Maine" was built at New York in 1848, and was 240'x32'x11', with a beam engine of 54 inches by 11 feet stroke, for the route, and was a great improvement in size and passenger accommodations and interior finish to anything there had been thus far on the Maine coast, but she was found to be too large and expensive a boat for the route, and during the next year was disposed of to the Fall River line.

James Cunningham, who had retired from the business of building marine engines at New York, seems to have still had a desire for an interest in steam navigation on the coast, as, in 1849, the "Senator" was built at New York for him and Daniel Drew, the vessel being 219'x35'6"x12', with a beam engine of 50 inches by 11 feet stroke. The vessel run in connection with the railroad from Portland to Bangor, for the

year, when she was sent around Cape Horn to the California coast during the gold excitement, where she remained and was worn out, completing her service about 1879, being succeeded by the more economical compound-engine screw propellers in the California Steam Navigation Company's line. They had built the "Admiral" a few years previous for the same service.

There was running to Bangor most of the year 1855, the propeller "General Knox," whose dimensions were 140'x24'x8', with vertical engine, 34"x36", but this service appears to have ended her career on the Maine coast.

There was a stern-wheeler on the Penobscot River for several years about 1850, named "Phenix," that was 82 feet long, with a water-wheel of 11 feet diameter and 9 feet face. There were several of these vessels built by Thos. Blanchard, of Springfield, Mass., at a much earlier date, for the upper Connecticut River.

The "Memenon Sanford" was built originally for the New York and Philadelphia outside route, and appears to have been the best of the fleet on the Bangor line, where she run regularly up to the outbreak of the Civil War. Her last service was under a charter to the Quartermaster's Bureau, from November 18th, 1862, at \$950 per day, in carrying troops to New Orleans, La. She was lost December 10th, 1862, on Carysfort reef, off the Florida Capes, in perfectly clear and still weather, having 800 troops on board, all of whom were saved. The engine was recovered and subsequently placed in the "George Leary," built in 1864, for the Baltimore and Norfolk line. The "Memenon Sanford" was 237'x34'x11'8, with a beam engine of 50 inches by 12 feet stroke.

In 1849 the following steamers were in service in Maine waters:

- "Admiral".....Boston to St. Johns.
- "Balloon".....Hallowell to Waterville.
- "Boston".....Boston to Kennebec River.
- "Charter Oak".....Boston to Hallowell.
- "Com. Preble".....Boston to Portland.
- "Danin".....Kennebec River.
- "Flushing".....Portland to Brunswick.

"Gen'l Warren"....	Boston to Portland.
"Governor".....	Portland to Bangor.
"Huntress".....	Portland to Hallowell.
"John Marshall"....	Boston to Portland.
"Kennebec".....	Boston to Hallowell.
"Phenix".....	Hallowell to Waterville.
"Penobscot".....	Boston to Bangor.
"Portland".....	Boston to Portland.
"T. F. Secor".....	Belfast, Castine and Bangor.
"Tarratine".....	Penobscot River.

In 1863 the Bangor line had John Englis & Son, of New York, construct the "Katahdin," and in 1867, the same builders constructed the "Cambridge." In 1882 the "Penobscot" was built at East Boston, Mass., by Smith & Townsend; in 1894 the "City of Bangor" was built at the same place, and in 1901 the "City of Rockland," the most complete vessel that has been on the line, was finished. The "Cambridge" went ashore and became a total loss off George's Island, on February 10th, 1886. The "Penobscot" was chartered to the Joy Line—New York to Providence—in the summer of 1901. About 1895 the "Katahdin" was broken up for the old material in the vessel.

The International Steam Ship Company was organized in 1859, with the same interest that controlled the Portland S. P. Co., to run a line from Boston to St. Johns, N. B., via Portland. The next year the "New Brunswick" was constructed for this route, and the following year the "New England" was built and added to the line. The latter was about the same class of side-wheel steamers as they had on the Portland line, but the former was somewhat smaller and with less power. The "New England" met with an accident on July 22d, 1872, while on her way from St. Johns to Boston, struck on the "Wolves," and in a short time filled. The passengers, baggage and freight were landed in good order. There was a dense fog prevailing at the time, and an unusually strong current set the vessel far to the southward of her course. The vessel was afterwards raised, taken to Portland, where she was rebuilt and named "City of Portland." The company had, prior to this, purchased the "New York," that had run on Lake Ontario before 1860. This vessel was about the same size, but had

more power of engine than those built for the line. In 1882, the company purchased the "Falmouth" from the New England & Nova Scotia S. S. Co., and in the same year built the "State of Maine." The latter vessel was the largest and with the most power of engine of any of the fleet that had been constructed for the line, being 244'x37'x14'7", and having an engine 60 inches by 12 feet stroke. In May, 1884, the company suffered the loss of the "Falmouth," by fire, while lying up at Portland for repairs. A few days after, the "City of Portland" run on a rock on the Maine coast, proving a total loss. The passengers were taken off by vessels that came to their assistance. In July of the same year, the "State of Maine" run ashore on the coast during a dense fog, the passengers being safely transferred to the mainland without injury. The vessel was, after a few months, gotten into deep water again, taken to Bath, Maine, where she was repaired and refitted for the line again. In 1885 the company had the "Cumberland" built at Bath, being a trifle larger than the "State of Maine." The first screw propeller for any of the regular lines on this coast since the "Warren" and the "Preble," was built by this company in 1895, the "St. Croix," of about the same length, but with a little more beam than their side-wheel boats. Since the propeller has been in service, the vessels have run direct from Boston to St. Johns during the summer months. Their present fleet consists of the "St. Croix" and the "State of Maine." The "Cumberland" was sold to the Joy Line in August, 1902.

BOSTON, MASS.

X The steamboat "Massachusetts," owned by some residents of Salem, was the first steamboat in service in Boston Bay. This vessel was built at Philadelphia, Pa., the hull being 82 feet long, 17 feet 10 inches beam, and drew 4 feet of water. Her first trip, from Salem to Boston, was on July 4th, 1817. This enterprise not proving a success, the vessel was withdrawn from the route after a few months, and was sent south to be sold, but was wrecked on the voyage on the coast of North Carolina. The "Eagle," of 80 tons, built at New London,

Conn., in 1817, took her place for a time, but run from Nantucket to New Bedford for a portion of the year.

X In the year 1818 the "Eagle" made the first steamboat trip from Boston to the town of Hingham, which is about eleven miles down Boston Bay. Her service was very irregular during that year, and it was not until 1819 that the vessel was placed on the route to make daily passages between these places. She was a very small boat, not over a hundred feet in length, and her accommodations not exceeding two hundred passengers. She ran until 1821, X after which there is no account of any communication except by sailing vessels until 1829. A very singular incident is, there was not in 1822 a single notice of a steamboat in Boston Harbor; where they all went to history is silent. At this period there was a demand for steamboats on the southern rivers along the coast, and more than probable some of them started for the southern waters. X The "Lafayette," built at Philadelphia, Pa., was the next boat on this route, and began running to Hingham in 1829. B She was somewhat smaller than her predecessor, and even in those early days of steamboating was not highly thought of, as she probably had one of those geared engines that made sufficient noise when in operation to raise a person in a trance. Before she was purchased by the Hingham Company, she was named the "Hamilton," which name always remained on her stern. There is an account of her being caught in a squall off the Castle on a trip to Boston, and being compelled to return to Hingham for safety. The "General Lincoln" succeeded the "Lafayette" in 1832, making her first trip on June 16th of that year. This vessel was built at Philadelphia, Pa., by J. Bond, for the Boston & Hingham Steamboat Company, which was organized during 1832. This vessel was 96'x21'x6'10, and was fitted with a pair of beam engines, having the solid "grate bar" beams, built by Thomas Holloway, of Philadelphia, Pa., and was at times run under the "high" steam pressure of 20 pounds to the square inch. The engines in this boat were put in two small boats, about 1849, that were in service in New York Harbor as tugboats, and named the "Storm" and the "Tempest." The "Mayflower," built in New York, of 262 tons, for this company, was placed on the route in July, 1845. She had accommodations for about

600 passengers. In 1856 the vessel was sold for use in New York waters. The "Nantasket," of 285 tons, being 146'x25'4 x8'2, was built in 1857, by Thomas Collyer, at New York, and placed upon the route in the following year, and at this date was considered the fastest boat in the harbor. In 1862 she was chartered to the United States government for service during the Rebellion, and in 1865 or 1866 returned to Boston, and was subject to numerous alterations, her name, prior to her return, having been changed to "Emeline." Her place was taken by the "Gilpin" and the "Halifax," the latter a stern-wheeler, until the "Rose Standish" was built in 1863, at Brooklyn, N. Y. This vessel was sunk by a collision with a tugboat in the harbor on August 28th, 1884, but was raised and repaired, and on the line again. The "John Romer," of 409 tons, built at Keyport, N. J., in 1863, and run from New York to Greenwich, Conn., for a few years, was purchased by the company, and placed on the route in 1866, but was subsequently sold and sent south. The "Governor Andrew," of 503 tons, was built in 1874, at Brooklyn, N. Y., by Lawrence & Foulks, for the company. The "Nantasket," built in 1878, at Chelsea, Mass., of 498 tons, was in the service of the company until a few years since, and, in 1901, was sold to the Long Island R. R. Co., for service on their Glen Cove route.

The Boston & Hingham Steamboat Co. was divided in 1881, the old company retaining the "Nantasket" and the "Rose Standish," and afterwards adding the "Twilight" and the "Wm. Harrison." The new company named the Hingham, Hull, & Downer Landing Steamboat Co., taking the "Governor Andrew" and adding by purchase the "Gen'l Lincoln" x "Nahant." This company was reorganized in 1890, as the Nantasket Beach Steamboat Co. Since then they have added, in 1891, the "Mayflower," with a beam engine; in 1895, the "Miles Standish," with an inclined compound engine and, in 1896, the "Hingham," with an inclined condensing engine, and in 1902 the "Nantasket" was added to the fleet, having a simple inclined condensing engine. They have now a fleet of fine excursion steamboats. The hulls were built by Montgomery & Howard, at Chelsea, Mass., and the machinery by the W. & A. Fletcher Co., of New York. The old company went out of business, closing out all its property about 1890.

Outside of the traffic in the harbor and to the coast of Maine, Boston merchants were slow to adopt steam vessels. As late as the fall of 1844 they established a packet line to Liverpool, that became famous during the following fifteen years, and it was only withdrawn when screw propellers came into more general use. In 1852 the Boston and Philadelphia S. S. Co. was started, with two steamers on the line, "Palmetto" and "City of New York," and later the "Phenias Sprague" and "Kensington." In the same year the Merchants' & Miners' Transportation Company was chartered by the State of Maryland, a part of the stock being held in Boston. Two side-wheel steamers were built, the "Joseph Whitney," of 208'x33'x17', with an engine of 52 inches by 11 feet stroke, and the "William Jenkins," of 205'x31'x10'6, with an engine of 56 inches by 9 feet stroke. The former made her first trip from Boston on December 28th, 1854. Two more side-wheel steamers, having iron hulls, the "S. R. Spaulding" and the "Benj. De Ford," were added in 1859, and the line extended to Savannah, Ga., but the breaking out of the war in April, 1861, suspended operations in that direction for some time. On August 8th, 1861, the "Joseph Whitney" was sold to the Quartermaster's Bureau of the War Department, for \$75,000, and her name subsequently changed to "McClellan." The names of the "Spaulding" and the "De Ford" were subsequently changed to "San Salvador" and the "San Jacinto," and run from New York to Savannah, Ga., after 1865. The company have since added to their fleet the "William Crane," in 1871; the "John Hopkins," in 1873; the "Decatur H. Miller," in 1879, and the "Alleghany" and the "Berkshire," in 1881, and several other fine propellers since then for their different routes.

In 1859 the Boston Board of Trade instituted measures to form a company that would operate a line of steamers between Boston and the Mississippi River, with New Orleans, La., as the terminal point, and incidentally with Havana and Savannah, Charleston, S. C., being expected to be in communication within the year. The only way open to Boston trade at that time below Baltimore, Md., was by sailing vessel direct, or through the port of New York for passengers and freight by steamships to all points on the coast. In March, 1860, the

Union S. S. Company was organized, with a capital of \$700,000, the organizers being Donald McKay, James W. Converse, Isaac Rich, John B. Alley, Daniel Lewis, and Lee Claflin. The breaking out of the war stopped all further operations of the company.

During the year 1865, the owners of the Neptune line, comprising the steamers "Neptune," the "Nereus," the "Glaucus," the "Metis," the "Thetis," and the "Doris," that had been running between Providence and New York, contemplated sending steamers around to Boston, but as some of their vessels were then under charter to the government, they were not enabled at that time to do so. Anticipating this movement, a few capitalists of Boston, comprising Peter Butler, J. B. Taft, James S. Whitney, and H. M. Whitney, having three or four unemployed steamers on their hands, made arrangements to place them in service on the outside route to New York. The first steamer was the "Jersey Blue," a propeller 133 feet long, built in 1849, then the "City of Bath," the "Ashland," the "Mary Sanford," and some others. In February, 1866, the line was chartered as the Metropolitan S. S. Company. In the meantime the Neptune S. S. Company had been consolidated with the Stonington line, under the name of the Merchants S. S. Company, and the latter having failed in 1866, the Metropolitan S. S. Co. purchased the "Nereus," the "Glaucus" and the "Neptune" in December of that year, and run them on their New York line. In 1873 the company had built their first iron-hull steamer, the "General Whitney," and in 1884 the "H. F. Dimock," and in 1887 the "Herman Winter," and in 1890 the "H. M. Whitney," and since then others have been added. Two of the old Neptune line propellers, the "Glaucus" and the "Neptune"—the "Nereus" was lost as a barge—have been laid up at Brooklyn, N. Y., for about fifteen years.

In 1863 the Cunard line sent only semi-monthly steamers to Boston, the same as when they began in 1840. This was not encouraging to Boston merchants, who were looking for a development of the export trade of the city, so a company was organized, with Boston capital, in July, 1864, under the name of the American S. S. Company, and about \$800,000 was subscribed. Many delays occurred, and it was not until October,

1865, that contracts were made for the construction of two wooden propeller steamships of large dimensions. In November, 1866, the "Ontario," the pioneer of the line, was launched, and during the following spring the "Erie" was launched. They were both built at Newburyport, Mass., by George W. Jackman. Their machinery was constructed by Harrison Loring, of Boston. They were each 340'x43'x27'x22 feet draft, and having two simple condensing engines, vertical cylinders set fore and aft, of 74 inches diameter by 4 feet stroke. The "Ontario" made one voyage only to Liverpool, leaving Boston, August 5th, 1867, and arriving at Liverpool on August 18th, and leaving Liverpool on September 7th, stopping at Queenstown, and arriving at Boston September 19th, 1867, and was then laid up. On June 3d, 1868, the "Ontario" and the "Erie," that had never made a voyage in the line, were sold at public auction to Nathaniel Winsor, for \$750,000. The misfortunes of this company had a discouraging effect upon those interested in the revival of American shipping in the transatlantic trade, but they met the same fate as the American lines that were occasionally running from New York at the same period. An apathy succeeded, and at last when a revival of business came, the Cunard line filled the service. About 1870 both of these vessels were sold to the New York and Brazil S. S. Co. to run in Garrison's line to Brazil and the West Indies. The "Erie" was totally destroyed by fire on January 1st, 1873, while on a voyage to New York, when 90 miles north of Pernambuco. No lives lost. The "Ontario" was laying up at Boston a few years later.

There was an effort made as early as 1855 among the merchants of Boston to organize a company to establish a line of steamships from Boston to Europe, and it even took shape in the organization of a company, named the Boston & European S. S. Co., with a capital stock of \$1,500,000. The members of the company included R. B. Forbes, G. B. Upton, Enoch Train, W. F. Weld, J. B. Bradlee, Donald McKay, Edward S. Tobey, Israel Whitney, F. W. Thayer, and about thirty others. There were no active operations taken toward building vessels at the time, but it went so far that models of vessels about 320 feet long were prepared. It is altogether probable that a more thorough investigation of the prospects for a new line,

both from the European side as well as this side of the Atlantic, put a damper on the enterprise. The treatment received at this period by the Collins line from the Congress, no doubt, had also its influence to defer operations.

The first timber dry docks built in this country were those constructed in 1854, at East Boston, Mass., by J. E. Simpson, who held a patent upon them. The first was commenced September 1st, 1853, and completed in May, 1854. This dock was 254 feet long inside of gates, 70 feet wide at the top, and 50 feet at the bottom. The second dock was started in April, 1855, and was finished in 80 days from commencement. This was 165 feet long, 46 feet wide, and 20 feet deep. Two large centrifugal pumps were so arranged as to pump from either dock at pleasure.



CHAPTER VIII.

OCEAN STEAMSHIPS.



THE first steamship to cross the Atlantic Ocean was the "Savannah," built by Francis Fickett, in 1818, at New York City. She was originally constructed as a sailing packet for New York and Havre line, but Capt. Moses Rogers, who had been employed by both Fulton and Stevens in commanding several of their early steamboats, induced Scarborough & Isaacs, a wealthy shipping firm in Savannah, Ga., to purchase the vessel and fit her with an engine and boiler. The vessel was about 100 feet long, 28 feet beam and 14 feet deep; was fitted with an inclined engine, built by Stephen Vail, of Speedwell, N. J., and the boiler by Daniel Dod, of Elizabethtown, N. J. The water wheels were of wrought iron, with eight radial arms, and so constructed as to be folded up like a fan. They were 16 feet diameter with 8 buckets in each wheel. The wheel houses were an iron frame covered with canvas. The vessel carried the same complement of spars and sails as a sailing ship of that period. The whole cost of the vessel was about \$50,000.

On March 28th, 1819, the vessel made a trip to Savannah from New York, arriving at the former port April 6th, in 8 days 15 hours. The engine was operated only 41½ hours during the trip. Shortly after she made a trip to Charleston, S. C., and returned to Savannah on May 1st.

On May 24th, 1819, the vessel left the port after which she was named, under command of Capt. Moses Rogers, for Liverpool, England, which port she reached on June 20th, making the voyage in 27 days, 80 hours of which the vessel was operated under steam. The *London Times* of June 30th, 1819, said, "The 'Savannah,' a steam vessel, recently arrived at Liverpool from America, the first vessel of the kind which ever crossed the Atlantic, was chased the whole day off the coast of Ireland by the 'Kite,' revenue cruiser on the Cork station.

which mistook her for a ship on fire." Left Liverpool July 23d, after remaining there a little over a month, for St. Petersburg, Russia, stopping at Stockholm and Cronstadt, where she arrived September 13th, having used her steam power 239 hours, or nearly 10 days out of 33 days while under way. On September 29th she started on her return to the United States, stopping on the way at a few of the Baltic ports, and arrived at Savannah November 30th, after a very stormy passage. A few days after, the vessel left for New York, stopping at Washington, D. C., on December 16th. Shortly after her machinery was removed and sold to James P. Allaire, and the hull converted to a sailing vessel and run between New York and Savannah, Ga., under command of Captain Holdridge until driven ashore in an east-northeast gale on November 5th, 1821, on Great South Beach, opposite Moriches, on the south shore of Long Island, while on a voyage from Savannah, where the vessel became a total loss. In all the authorities the loss of this vessel is given as 1822, nothing more definite than the year. That seems to have been a failing of the early writers, to omit the details in many cases. The steam cylinder of this engine was on exhibition at the Crystal Palace Fair in New York in 1856. The occasion of her failure as a steamship was the large amount of space occupied by the machinery and that required for the stowage of wood for fuel, thus leaving a small space for cargo.

There have been a few attempts made to dispute the history of the "Savannah" as the pioneer ocean steamer of the Atlantic, and call it a fallacy. The latest of such endeavors was to bring forward a British steamer named "City of Kingston," as arriving here about 1814. When this was examined it was found there was such a steamer, but she did not arrive here until 1838, about the time of the "Sirius."

There was a long period of time after the "Savannah" before another American steamship crossed the Atlantic Ocean, and during that period there had been much knowledge gained of steam navigation that was of service in constructing ocean steamers.

There were two side-wheel steamers built in this country for the Spanish navy, in 1841, named at first the "Lion" and the "Eagle," but subsequently "Regent" and "Congress." They

were built by Jacob Bell, at New York, and were 154'x30'x14'6, with side-lever engines by Novelty Works, having cylinders 42"x4' 7". About the same time there was also built for the Russian navy the "Kamschatka," by Wm. H. Brown, at New York, being 219'x35'10"x24'6, and fitted with one of Lighthall's half-beam engines, 62"x10', built by H. R. Dunham & Co. There was considerable discussion at this time in naval circles as to the different types of steamers for naval purposes, for the United States were then building the "Missouri" and the "Mississippi" for the U. S. Navy, much larger vessels than those for the foreign navies.

After the "Savannah" there was no steamship owned or run by an American company that navigated the Atlantic Ocean to a port in Europe until 1847, when the Ocean Steam Navigation Company of New York had two steamships constructed by Westervelt & Mackay at New York, named "Washington" and the "Herman." The directors of this company were C. H. Sand, Edward Mills, William Chamberlain, John A. Iselin, C. W. Faber, Horatio Allen, Mortimer Livingston and John L. Stephens. These vessels were constructed like heavy sailing vessels, but longer, and were simply long square-sterned three deckers, with one white streak along the sides and painted black at intervals for ports. They were bark rigged. Their construction was of heavy timber, in accordance with the rules then prevailing for sailing vessels. The "Washington" was 230'x39'x31', and the "Herman" 235'x40'x31' deep. They had each two "side-lever" engines of 72"x10' stroke, built by the Novelty Iron Works. During the first year they were the subject of several alterations, their boilers proving too small for their work, and their paddle wheels too large. These vessels run to Bremen, touching at Cowes, twice a month, the "Washington" being the pioneer, and leaving on her first voyage June 1st, 1847. The "Herman" started on her first voyage March 21st, 1848. They run under a contract of the company to carry the U. S. mail, for which they received the sum of \$200,000 per annum. The postage at this time from New York to Europe on letters was 24 cents for one half ounce or less, and 48 cents half an ounce to one ounce, and 15 cents every additional half ounce. Every newspaper and pamphlet 3 cents each.

In 1857, when Congress refused to make an appropriation for the renewal of any of the foreign mail contracts, it compelled the withdrawal of the vessels from the service at the expiration of their contract. These vessels were subsequently sent to the Pacific Ocean. The "Washington" was broken up in 1863, and the "Herman" was lost on the coast of Japan February 13th, 1869.

In the same year Charles H. Marshall & Co., owners of the Black Ball line of packet ships running from New York to Liverpool, had built for them, by William H. Webb, the steamship "United States," of 1904 tons. This vessel sailed on her first voyage in the spring of 1848 for Liverpool, and after making a few more voyages, and they not proving a success from a commercial point of view, the vessel was withdrawn, and in February, 1849, sold to the Prussian Government, and afterwards was again in the merchant service.

In 1849, the New York and Havre Steam Navigation Company obtained a contract from the United States Government to carry the mail between New York and Havre, stopping at Cowes, for which service they received the sum of \$150,000 per annum for a fortnightly service, and in that year had constructed for them, by Westervelt & Mackay, the "Franklin," whose hull was 263'x41'10"x26', and in 1850, the "Humboldt," whose dimensions of hull were 292'x40'x27'. These vessels had each a pair of side-lever engines, built by the Novelty Works, the cylinders being 93"x8' stroke for the "Franklin," and of the "Humboldt," 95"x9'.

The average passages of these vessels were, the Bremen line out of New York, 14 days and 9 hours, and to New York, 13 days 20 hours. The Havre line eastward, 12 days 10 hours, and westward, 12 days 16 hours.

The "Franklin" and the "Humboldt" continued on the Havre service until they were lost, the "Humboldt" on December 5th, 1853, in entering the harbor of Halifax, N. S., and the "Franklin," July 17th, 1854, was lost off Montauk Point, Long Island. The company chartered other vessels to continue the line until the "Arago" and the "Fulton" were built, in 1855. The "Arago" was constructed by J. A. Westervelt & Sons at New York, with the hull dimensions of 283'x39'3"x24'6"; had a pair of oscillating engines, built by the Novelty Iron Works,



"BROTHER JONATHAN."

"BAL TIC."

"GOLDEN GATE."

"SOUTHERNER."

OCEAN STEAMSHIPS OF 1850.

with cylinders 65"x10' stroke. The "Fulton" was built by Smith & Dimon, of New York, whose hull dimensions were 280'5"x42'x24'; also had a pair of oscillating engines of same size as those in the "Arago," but built by the Morgan Iron Works. These vessels were a great improvement on their predecessors of the line in every way, and continued the service to Havre until 1861, when they were withdrawn and chartered by the United States Government. The line was well managed and cared for in its operations, and received more American patronage during its career than any other to the same ports.

The next line of ocean steamships to carry the American flag at the peak as an ensign of their nationality was the far-famed Collins line, which company was formed about 1847. The corporate name of the company was "The New York and Liverpool U. S. Mail S. S. Co.," and the trustees or board of directors were James Brown, E. K. Collins, W. S. Wetmore, Stewart Brown and Elisha Riggs. The paid-in cash capital was \$1,200,000. They had at first four vessels built for the service between New York and Liverpool—the "Atlantic," in 1849, by William H. Brown, and the "Pacific," in the same year, by Brown & Bell, both of New York. The machinery for the "Atlantic" was constructed by the Novelty Iron Works, while that for the "Pacific" was constructed by the Allaire Works. In the next year two more vessels were built for the company, the "Arctic," and the "Baltic," the former by William H. Brown, and the latter by Brown & Bell. The machinery of the "Arctic" was built by the Novelty Iron Works, and that of the "Baltic" by the Allaire Works. The model for these vessels was made by George Steers, the designer of the yacht "America" of that period.

The specifications for the building of these vessels called for the following dimensions for the hulls, viz.: Length of keel, 277 feet; length on main deck, 282 feet; depth under main deck, 24 feet; breadth of beam, 45 feet; frames, white oak and chestnut, double, 10 to 12 inches, and molded 20 to 21 inches, and spaced 30 to 36 inches, centre to centre. Outside plank of yellow pine 5 to 7 inches thick, and next to keel of white oak 9 inches thick and 15 inches wide. Main keelson of white oak, 32 inches by 34 inches deep; under engines, 22 inches in

width and 42 inches deep, of white oak and yellow pine. In construction there was a difference of 3 to 5 feet in the length of the vessels. The engine keelsons were found to be the weakest part of the structure.

These vessels were each fitted with a pair of "side-lever" engines, the "Arctic" and the "Baltic" having cylinders 96 inches diameter and 10 feet stroke, while the "Atlantic" and the "Pacific," that were the first built, had cylinders 95 inches by 9 feet stroke. The engines had balanced puppet steam and exhaust valves. Each vessel had also four vertical tubular boilers, with double row of furnaces, designed by John Faron, who was chief engineer of the line. These vessels cost complete, \$2,944,000. They had large passenger accommodations, the cabins being large and roomy. The saloons were very elaborate in their finish, an extravagant sum having been expended upon the decorations in the saloons and cabins.

The line started under a contract to carry the United States mail for \$385,000 per annum, which was afterwards increased to \$858,000 per annum, yet with this large subsidy, and a large share of the passenger travel and freight, it failed to be a paying line. The passenger travel they commanded on account of the superior accommodations offered and the reputation they had for quick passages. The expenses at the end of every return trip to New York for repairs to the engines and boilers, after the vessels had been running a short time, was very great. Large numbers of mechanics being sent from the Novelty Iron Works, who worked day and night until the repairs to the machinery were completed, that in some cases were but a few hours before the time of sailing, that had become necessary by the heavy strain that had been put on the machinery during the voyage. The rivalry existing with the Cunard line at this period to make the best time was so great as to cause them to make all possible endeavors to accomplish their object, which in the end was one of the causes of the failure of the company. Then the withdrawal of a large portion of the mail compensation was an important factor at a later date. The Collins line was not the only one to incur heavy expenses in repairs at the end of each voyage, for the Cunard line, after the Collins ships had shown their higher speed, and therefore their ability to lessen the time in crossing

the Atlantic Ocean, began to wake up to the necessity for keeping pace, if possible, with their American rivals, and in their exertions to do so met with similar mishaps as occurred to the Collins steamers. Previous to the Collins line going into operation, the Cunard steamships were not driven for time, as there were no steam vessels running between New York and Great Britain that were able to make the time of the Cunard steamships. These vessels have been known to come into the port of New York during the period of the rivalry with their motive power in a very bad condition, but so careful were they to guard this from the knowledge of the American marine circles that it was almost impossible for a stranger to get near the engine room, never mind how plausible the excuse. More than one American engineer got there. In more than one instance the vessels have come into port totally disabled in one engine, so that they were compelled to return to the home port on the other side of the Atlantic Ocean with the power of but one engine. This could not always be hid from passengers with a knowledge of marine engines, as was found to be the case more than once. The Collins line met with but one serious accident to any of the vessels' machinery, and that was the breaking of the shaft of the "Atlantic" engines when a few days out. She made her way safely in return under sail.

Respecting the relations of the Congress to the appropriations for the mail compensation paid the company, the facts would appear to be: After the company had operated the line for about two years, it was found that the expenses of driving their steamers on every voyage to reduce the time made by their rivals, was more expensive than their mail pay would make good; otherwise it was expensive business to be striving for "record time" every voyage. So the company, in 1852, made application to Congress to increase the amount for their carrying of the mail, and submitted the following figures to show that it was an unprofitable investment to those interested in the company.

Average cost of each voyage.....	\$65,216.64
“ receipts are.....	48,286.85
Loss.....	<u>\$16,929.79</u>

This included repairs and insurance. They asked that the amount paid them be increased from \$19,250 to \$33,000 per voyage. That was reported on favorably, and the amount was included in the Deficiency bill for that year. The number of voyages was increased from 20 to 26 per year, thus making their receipts from that source \$858,000. It was right after this that trouble commenced in Congress by attacks being made upon the company by certain interests in the halls of our National Legislature. It was not effective at first, but it gathered force in time, and by 1856 began to make itself felt. During the winter of 1854-55, the company submitted another statement of its affairs, showing as follows, viz.:

Total receipts for passengers and freights	\$4,460,857.38
Mail pay received from United States	3,413,966.00
	<hr/>
Total receipts	\$7,874,823.38
Total disbursements	7,207,291.91
	<hr/>
	\$667,531.47
To offset which:	
Loss of the "Arctic"	\$255,000.00
Depreciation on investment	258,000.00
Interest upon capital, 7%	408,000.00
	<hr/>
	\$921,000.00

In 1857 Congress cut down the appropriation to the original sum per voyage of \$19,250, and limiting the number of voyages to eighteen per annum, thus making the yearly sum \$346,500. It is certain, if the company could not pay expenses when the vessels were new with a mail pay of \$19,250 per voyage, they would find it more difficult when the vessels were five years old, and requiring more extensive repairs, on a mail pay of the same amount. During the next year in Congress, or beginning the winter of 1857, the subject came before them again in the annual appropriation bill, and it was placed at the same amount as for the previous fiscal year. At this period it should be remembered that the feeling existing be-

tween the Northern and Southern States were very much strained politically, caused by the agitation for some time in Congress of the question of slavery in the territories, and the further question of the tariff, that had united the members from the Southern and Western States advocating those interests, and they being in a majority in the House and Senate, had it in their power to cut down all appropriations that were, as they considered, inimical to those interests. While they did not terminate the contract, they refused to appropriate a sufficient amount for its profitable prosecution.* It was under these circumstances that the Collins line withdrew their steamships from the service. They were virtually "frozen out" by Congress. The "Baltic" made the last voyage sailing from New York on January 16th, 1858. The hulls of these vessels were certainly well constructed, and the engines well proportioned in their several parts, and constructed, to have stood being continuously "under the whip" for so many years.

* An incident regarding this line of steamships and the subsidy was thus related to the author by one who held at the time an important appointment at Washington, who was informed by one of the principals in the affair of the facts at the time.

"At the time of the loss of the 'San Francisco,' in December, 1853, while under the command of Capt. James T. Watkins, there were on board as passengers about two hundred officers and soldiers of the regular army who were destined for the Pacific coast. All on board were saved by two sailing vessels, one going to England and the other to a port in the United States. On board the former was a large company of the soldiers, who were finally conveyed to Liverpool, in company with the captain of the 'San Francisco.' On account of the anomalous position in which they were placed, or for other cause, the officers commanding these troops were very anxious to return to the United States at the earliest possible moment. With this view, Captain Watkins called upon the agent of the Collins line at Liverpool and asked his attention to the peculiar position in which these soldiers were placed—a company of the regular troops on British soil in times of peace—and begged him to make immediate provision for their departure to the United States by the next steamer sailing. This he was unable or unwilling to do. Capt. Watkins then went to London and laid the matter before the Hon. James Buchanan, at that time the American Minister to England, who was much disturbed at the refusal to take on board these shipwrecked United States troops, when, as told, these very steamships were running under a heavy subsidy from the United States government for carrying the mail. These troops were taken on board a succeeding American steamship, but the American Minister expressed the greatest indignation at the course pursued by the foreign managers of the line in this affair, and declared that he would, on his return to the United States, advise a cutting down of the mail pay of this line. Mr. Buchanan shortly after his return to this country was elected to be President of the United States."

To show the sectional feeling existing at this time in Congress, the following is an extract from a speech made by a member in the United States Senate, at a time the measure was under discussion, viz: "It concentrates the goods at whatever point you bring the steamers, and that is another objection I have. You now run all your lines of steamers from New York, except a little one from Cuba to Charleston. It cheapens freights at New York, even among themselves; it concentrates there, injuriously to the rest of the country. If you pay a hundred ships from every point where you have freight, to bring goods in for nothing to New York, you will effectually violate the provision of the Constitution that forbids you from discriminating in favor of one port. You do, by running steamers out of New York, cheapen freights to that particular point, and give it an advantage over every other point in the country. They understand it; and therefore I do not wonder that those who are not mindful of the great principle of right, those who consider that the supremest good is to benefit themselves at the cost of everybody else, worship this principle of monopoly. . . . I trust the policy you have half inaugurated of giving no more subsidies to these people, but granting the letter postages to anybody that will bring the mails, leaving them to rely on the postages alone, will be carried out."

In the appropriation bill for the same year was a provision that was the first of its kind after the mail steamers were established in "appropriation of the mail compensations to our foreign lines, of authorizing the payment of sea and inland postage to American vessels, and sea postage only if by a foreign vessel; but preference to be given to an American vessel."

The first disaster that the fleet of the company met with was the loss of the "Arctic," on September 27th, 1854, the vessel being sunk by a collision with the French propeller "Vesta" when 40 miles off Cape Race, whereby 307 lives were lost, while on the voyage from Liverpool to New York. The "Atlantic" broke her shaft when nine days out from Liverpool, on January 6th, 1851. With heavy seas and head winds, tried to make port at Halifax and, being unsuccessful, tried Bermuda, but was forced at last to head for Cork, Ireland, where she arrived January 22d. Repairs were made at Liver-

pool. Then, in just about two years after the loss of the "Arctic," the "Pacific," which sailed from Liverpool for New York on September 23d, 1856, with a total of 288 persons on board of passengers and crew, was never heard from after sailing. This loss of the "Arctic" was evidently one of the results of the endeavors to make fast time. The collision took place at about noon, in a very dense fog, and while they were going under a speed of, it was estimated by those on board, 13 miles an hour, and without any fog signals being used to warn other vessels of their situation. This driving ahead at such a speed under conditions similar to this case was deemed extremely hazardous by some of the captains of the line, and one who was thought to be a very prudent commander is known to have said that he has been in the wheel-house of his vessel with the bell pull in his hand, and has trembled for the safety of his vessel and passengers, for he was aware of the great risk he run in dashing ahead at such a rate of speed in a fog, but it was necessary that time be made.

After the loss of the "Arctic," as one of the chartered vessels, the "Nashville," that belonged to the New York and Charleston line, made one voyage in the Collins line, leaving New York in March, 1855; time, 12 days. The return voyage was made in 16 days, having heavy westerly gales.

Between the loss of the "Arctic" and the "Pacific" the company had started the building of the "Antarctic," or, as afterwards named, the "Adriatic." This vessel was originally completed in 1856, but on account of changes made in the steam valves and valve gear to the engines, the vessel was not ready for service until the summer of 1857. These were the largest marine engines of that type built in this country to that date. The hull of this vessel was built by George Steers, at New York City. The dimensions were: length over all, 351 feet 8 inches; length on load line, 343 feet 10 inches; breadth of beam, molded, 48 feet 8 inches; depth of hold to spar deck, 33 feet 2 inches; draft of water when light, 17 feet 11½ inches; frame molded 22 inches, sides 13 inches and 16 inches, and apart at centres 33 inches and 36 inches; hull strapped with diagonally and double-laid iron straps 5 inches by 7⁄8 inches. The vessel was fitted with two oscillating en-

gines, by the Novelty Iron Works, each having cylinders of 100 inches diameter by 12 feet stroke; main shaft, $26\frac{1}{2}$ inches diameter, forged at Reading, Pa. There were also two Pirrson's surface condensers. Silver's patent marine engine governor was fitted to the engines of this vessel, as well as to the other vessels of the line. The surface condensers and the governors were both American inventions. There were eight Martin's vertical tubular boilers, same type as in the other vessels, for a working pressure of steam of 25 lbs. to the square inch. Consumption of fuel was 90 to 95 tons every 24 hours. The other steamships of the line consumed from 75 to 85 tons per day. The water-wheels were 40 feet diameter with 32 buckets 12 feet long by 36 inches deep. Two smoke chimneys, each 40 feet high by 7 feet diameter, and standing fore and aft. This vessel made but one voyage to Liverpool in the Collins line, leaving New York November 21st, 1857, and making it in 11 days and 2 hours, but 27 hours of this time the vessel lay to on account of hot journals and other causes. After the line had been closed out, in 1858, the vessel was laid up until April, 1860, when the North Atlantic S. S. Co., the new owners, placed her on the line from New York to Southampton and Havre, where she did service until March, 1861. During this period there were three American lines to Havre, and none of them with a mail contract with the United States government: the "Fulton" and the "Arago," in Livingston's line; the "Vanderbilt" and the "Illinois," in Vanderbilt's line, and the "Adriatic." Just previous to her withdrawal from the Havre line, the vessel passed into the possession of the Lever line, New York and Galway, and under the British flag. Before the "Adriatic" was accepted for the British mail service, she was given an official trial in March, 1861, and made four runs on a measured mile, with the following results:

1st run—4 min. 31 sec., or 13.284 knots per hour.

2d run—3 " 18 " " 18.18 " " "

3d run—4 " 20 " " 13.846 " " "

4th run—3 " 21 " " 17.910 " " "

Mean speed of 15.908 knots per hour.

Revolutions of engines, 17 to 18 per minute.

Pressure of steam, 25 lbs.

Draft of water forward, 17 feet 2 inches.

Draft of water aft, 18 feet 10 inches.

Surface condensers.

After the withdrawal of the vessels from the Liverpool service in January, 1858, trouble for the company commenced. They were not the only business enterprise at that time in the country in financial straits, as the business community was but just beginning to recover their senses after the panic in the Fall of 1857. The vessels were seized for debt and sold by the sheriff, on April 1st, 1858, for \$50,000, subject to claims amounting to \$657,000—some of which were disputed by the company—to Dudley B. Fuller, who represented the former owners. The vessels were unemployed for a period of over a year, having in that time been overhauled, but in September, 1859, the "Baltic" and the "Atlantic" were put to service on the New York and Aspinwall route, where there was already plenty of excitement. There always appears to have been plenty of that commodity along any path where Commodore Vanderbilt was interested. They run to the Isthmus until March, 1860, and for a year had little if any employment until the outbreak of the Civil War, when they were chartered by the North Atlantic S. S. Co. to the Quartermaster's Bureau of the War Department at once, and were kept under charter until near the close of the conflict. The "Atlantic" was broken up in September, 1871, in Cold Spring Harbor, New York, for the old metal in her. The "Baltic" was sold about 1870 to Boston, Mass., parties, who removed her machinery and used her as a sailing vessel. About 1880 this vessel was also broken up, which removed from usefulness the last of that famous but unfortunate fleet of the Collins line.

A few of the quick voyages of these vessels would include the

D. H. M.

"Pacific," May, 1851, N. Y. to Liverpool. . 9.20.16. 73 tons coal.

"Atlantic," July, 1852, N. Y. to Liverpool. 10.00.15. 78 "

"Baltic," Aug., 1852, Liverpool to N. Y. . . 9.13.00.

"Arctic," Feb'y, 1853, N. Y. to Liverpool. 9.17.12. 82 "

"Baltic," Sept., 1857, N. Y. to Liverpool. . 9.23.00.

The following is a description of the appearance of the "Atlantic," from a British point of view, on her first arrival at Liverpool: "The steamer's appearance is not prepossessing; she is undoubtedly clumsy. The three masts are low, the funnel is short and dumpy, there is no bowsprit, and her sides are painted black, relieved only by one long streak of dark red. Her length between perpendiculars, that is, the length of her keel, is 276 feet; breadth, exclusive of paddle boxes, 45 feet; thus keeping up the proportions as old as Noah's ark of six of length to one of breadth. The stern is rounded, having in the centre the American eagle clasping the starred and striped shield, but no other device. The figure-head is of colossal proportions, intended, some say, for Neptune; others say that it is the old Triton blowing his wreathed horn, so lovingly described by Wordsworth; and some wags assert that it is the proprietor of the ship blowing his own trumpet. The huge bulk of the 'Atlantic' was more perceptible by contrast with the steamer—none of the smallest—that was now alongside, for, though the latter was large enough to accommodate about four hundred people on deck, yet its funnel scarcely reached as high as the bulwarks of the 'Atlantic.' The diameter of the paddle-wheels is 36 feet, and the floats, many of which, split and broken, were lying about in the water, are nearly 15 feet long.

"Like all the other Atlantic steamers, the run of the deck is almost a straight line. Around the funnel, and between the paddle boxes is a long wooden house, and another is placed at the stern. These contain the staterooms of the captain and officers; and in a cluster are to be found the kitchen, the pastry room, and the barber shop. The two former are like similar establishments replete with every convenience, having even a French maître de cuisine. But the latter is very unique. It is fitted up with all necessary apparatus—with glass cases containing perfumery, etc.; and in the centre is the barber's chair. This is a comfortable, well-stuffed seat, with an inclined back. In front is a stuffed trestle on which to rest feet and legs; and behind is a little stuffed apparatus, like a crutch, on which to rest the head. These are movable, so as to suit people of all sizes; and in this comfortable horizontal position the passenger lies, and his beard is taken off in a

twinkling, let the Atlantic waves roll as they may. The house at the stern contains a smoking room and a small compartment, completely sheltered from the weather, for the steersman. The smoking-room communicates with the cabin below, so that, after dinner, those passengers so disposed may, without the least exposure to the weather or annoyance to their neighbors, enjoy the weed of old Virginia in perfection. This smoking-room is the principal prospect of the man at the helm, who, however, has to steer according to his signals. Before him is a painted intimation that one bell means "port" and two bells "starboard"; a like intimation appears on the large bell in the bow of the ship; and, according to the striking of the bell, so must he steer.

"Proceeding below, we come to the great saloon, 67 feet long, and the dining saloon, 60 feet long, each being 20 feet broad, and divided from each other by the steward's pantry. This pantry is more like a silversmith's shop, the sides being lined with glass cases stored with beautifully burnished plate. Crockery of every description, well secured, is seen in great quantities, and the neatness of arrangement shows that the gilded inscription full in sight of every visitor—"A place for everything, and everything in its place"—has been reduced to practice. Above the tables in the dining saloon are suspended racks, cut to receive decanters, glasses, etc., so that they can be immediately placed on the table without the risk attendant on carrying them from place to place. The two saloons are fitted up in a very superior manner; rose, satin and olive are the principal woods that have been used, and some of the tables are of beautifully variegated marble, with metal supporters. The carpets are very rich, and the coverings of the sofas, chairs, etc., are of the same superior quality. The panels around the saloons contain beautifully finished emblems of each of the States of the Union, and a few other devices that savor very strongly of republicanism. For example, a young and beautiful figure, all radiant with health and energy, wearing a cap of liberty, and waving a drawn sword, is represented trampling on a feudal prince, from whose head a crown has rolled in the dust. The cabin windows are of beautifully painted glass, embellished with the arms of New York and other cities in the States. Large circular glass

ventilators, reaching from the deck to the lower saloon, are also richly ornamented, while handsome mirrors multiply all this splendor. The general effect is of chasteness and a certain kind of solidity. There is not much gilding, the colors used are not gaudy, and there is a degree of elegant comfort about the saloons that is sometimes wanting amid splendid fittings. There is a ladies' drawing-room near the chief saloon, full of every luxury. The berths are about 150 in number, leading out as usual from the saloons. The most novel feature about them is the wedding berths, wider and more handsomely furnished than the others, intended for such newly married couples as wish to spend the first fortnight of the honeymoon on the Atlantic. Such berths are, it seems, always to be found on board the principal river steamers in America, but are as yet unknown on this side of the water. Each berth had a bell-rope communicating with a patented machine called the "Annunciator." This is a circular plate, about the size of the face of an eight-day clock, covered with numbers corresponding with those of the staterooms. Each number is concealed by a semi-circular plate, which is removed or turned around as soon as the rope is pulled in the stateroom with the corresponding number. A bell is at the same time struck to call the attention of the stewards, who then replace the plate in its former position and attend to the summons.

"The machinery which propels the ship consists of two engines, each of 500 horse-power, the engines of the old line being also two in number but only about 400 horse-power each. Such cylinders, and shafts, and pistons, and beams are, I believe, unrivalled in the world. There are four boilers, each heated by eight furnaces, in two rows of four each. The consumption of coal is about 50 tons every 24 hours, 'and that,' said one of the engineers, 'is walking pretty fast into a coal mine, I guess.' According to the calculations of the very wise men who predicted the failure of Atlantic steam navigation, such a vessel as the 'Atlantic' ought to carry 3,700 tons of coal; but it will be seen that one-fourth of that quantity is more than enough, even making allowance for extra stores to provide against accidents. In the engine-room is a long box with five compartments, each communicating with a wire

fastened like a bell-pull to the side of the paddle box. The handles are marked, respectively, "Ahead," "Slow," "Fast," "Back," and "Hook on," and whenever one is pulled, a printed card with the corresponding signal appears in the box opposite the engineer, who has to act accordingly. There is thus no noise of human voices on board this ship: the helmsman steers by his bells, the engineer works by the telegraph, and the steward waits by the annunciator.

"Some traces of national habits struck me very much. Even in the finest saloon there are in places where they would be least expected, handsome spittoons—the upper part fashioned like a shell and painted a sea green or sky blue color—thus giving ample facility for indulging in that practice of spitting of which Americans are so fond.

"Upon the whole, this Atlantic steamer is really worthy of the great country from which she came. If in shape and general appearance she is inferior to the old vessels, she is decidedly equal, if not superior, to them in machinery and fittings. Her powers as regards speed have, of course, yet to be tried. One voyage is no test, nor even a series of voyages during the summer months; she must cross and re-cross at least for a year before any just comparison can be instituted."

During the height of the rivalry between the Collins and the Cunard lines, there appeared a letter in a London paper which was copied very extensively at the time into the English journals. It was very apparent how anxiously some English interests desired the impression to prevail that the Americans were copyists, and that for the signal triumph of their ocean steamers they were indebted to British genius and skill. This letter met the eye of James Brown, Esq., President of the Collins line, who brought it to the notice of Stillman, Allen & Co., of the Novelty Iron Works, whose reply is annexed and speaks for itself:

"BRITISH AND AMERICAN STEAMERS.

"In your number of the 4th inst., you quoted an extract from an American paper, in which it is stated that improvements made in the steam engine by Americans have been adopted in building the last fast boats of the Cunard line, and that in the extra fast boats of the same line now in course

of construction, 'they are to go the whole figure, and fashion the engines entirely after the most approved American models.' By giving currency, as you have done, on this and other recent occasions, without comment, to the overweening estimates which the Americans form of their own superiority, you appear to me, Mr. Editor, to do much towards weakening the well-founded confidence which has hitherto been entertained in the perfection of British machinery, *thereby injuring British interests, particularly with reference to the demands for engines from foreigners.*

"It is time, therefore, that the real facts of the case respecting the manufacture of the engines on board the Collins American line of steamers (the vessels more immediately alluded to in the American newspaper) should be made known, which I now do, from undoubted authority, and as regards some of the particulars, from my own knowledge, and which are as follows:

"The United States Government, perceiving the failure of all attempts that had been made to establish an American line of Atlantic steamers which should compete, in point of speed and efficiency, with the Cunard line, and deeming it of the greatest national importance that this inferiority should no longer continue, subsidized with a large annual subvention Collins line (besides, it is believed, giving pecuniary aid in some shape or other, towards the construction of the vessels), on condition that no expense should be spared in obtaining the most perfect and efficient engines that could be constructed; and as there was at that time (although it is only two years ago) no manufacturer in the United States who could make engines fulfilling these conditions, the contractors for the American line turned their views towards the Clyde, and obtained permission from the proprietors of the Cunard line to take mouldings or castings of every part, even to the minutest particular, of the engines constructed by Napier, of Glasgow, on board the largest of their vessels; and in order that nothing might be wanting to make the engines equal to those in the Cunard steamers, the contractors imported men from the manufactories on the Clyde, for the purpose of making the engines in New York, so that they might be of national or American fabric.

"As, therefore, the last constructed and fastest of the American ocean-going steamers are made entirely after the British model, and by Britishers, you will perceive, Mr. Editor, how likely it is that the Cunard vessels now in course of construction are to be fitted with engines made after the American model.

"Where, indeed, have the Americans anything better to show than the engines on board the Collins line, which are made after the British model?

"BRITANNICUS."

Stillman, Allen & Co., of the Novelty Iron Works, having constructed the engines for the "Atlantic" and the "Arctic," replied to the misstatements in this letter through James Brown, President of the Collins line, in the following manner: "JAMES BROWN, ESQ.

"DEAR SIR,—I enclose the piece cut from *Galignani's Messenger*. It is quoted from the *London Builder*, and it is strange, indeed, that misrepresentations so utterly without foundation should find a place in any journal of any respectability.

"The writer says, as 'from undoubted authority, and as regards some particulars from his own knowledge,' that 'the contractors of the American line obtained permission from the proprietors of the Cunard line to take mouldings or castings of every part, even to the minutest particular, of the engines constructed by Napier, of Glasgow, on board the largest of their vessels.'

"It does not seem to have occurred to the author of this remarkable assertion, whether it was very probable that the proprietors of the Cunard line would feel disposed to render any such aid to a rival company, nor does he explain by what mechanical process the ignorant Yankees were able 'to take mouldings or castings of every part, even to the minutest details of engines,' on board of a vessel.

"How utterly without foundation this assertion is, any may see who will barely look at the two sets of engines; even a casual glance is enough to show their utter dissimilarity throughout, in plan and in detail; not one piece of one is like one piece of the other; and on this point the engines speak

for themselves. They differ about as much as two sets of side-lever engines can differ.

"But according to this writer, the possession of all the mouldings or castings was not enough, and therefore (he goes on to say) 'in order that nothing might be wanting to make the engines equal to those in the Cunard steamers, the contractors imported men from the manufactories on the Clyde, for the purpose of making the engines in New York.'

"A few facts will show the grossness of this misrepresentation, and exhibit the purely American character of the engines we built for your company.

"Of the proprietors of our concern, every one is a native of the United States, and acquired here whatever mechanical skill or knowledge he possesses.

"Of our foremen, every man (with one exception) was born in the United States, learned his trade in this country, and whatever they have done in connection with the marine engines, has been at our works. The one exception referred to has been employed at our works for the last nineteen years, and never did any work for marine engines in any other place.

"The draughtsmen who made the drawings are our pupils, and acquired all the knowledge and experience they have in connection with steam engines in our drawing room. The men who superintended the setting of the engines are also natives of the United States, were once our apprentices, and acquired at our works whatever skill and experience they have.

"No man was ever imported from the manufactories of the Clyde, or from any other quarter, with reference to those engines, and neither in the preparation of the plans, nor in the construction of the work, did we ever receive any assistance, direct or indirect, from any engineer on the banks of the Clyde, or from any other part of Great Britain.

"In short, the engines were made of American iron, forged and melted with American coal; they were planned by American heads, and put together by American hands. In plan and many important features, they differ, not merely from the Cunard engines, but also from any ever built on the other side of the Atlantic, and we are happy to find that their

excellence is so far acknowledged as to render our English friends anxious to claim the credit of having produced them.

“Respectfully yours,

“STILLMAN, ALLEN & Co.,

“New York, Dec. 23d, 1851.”

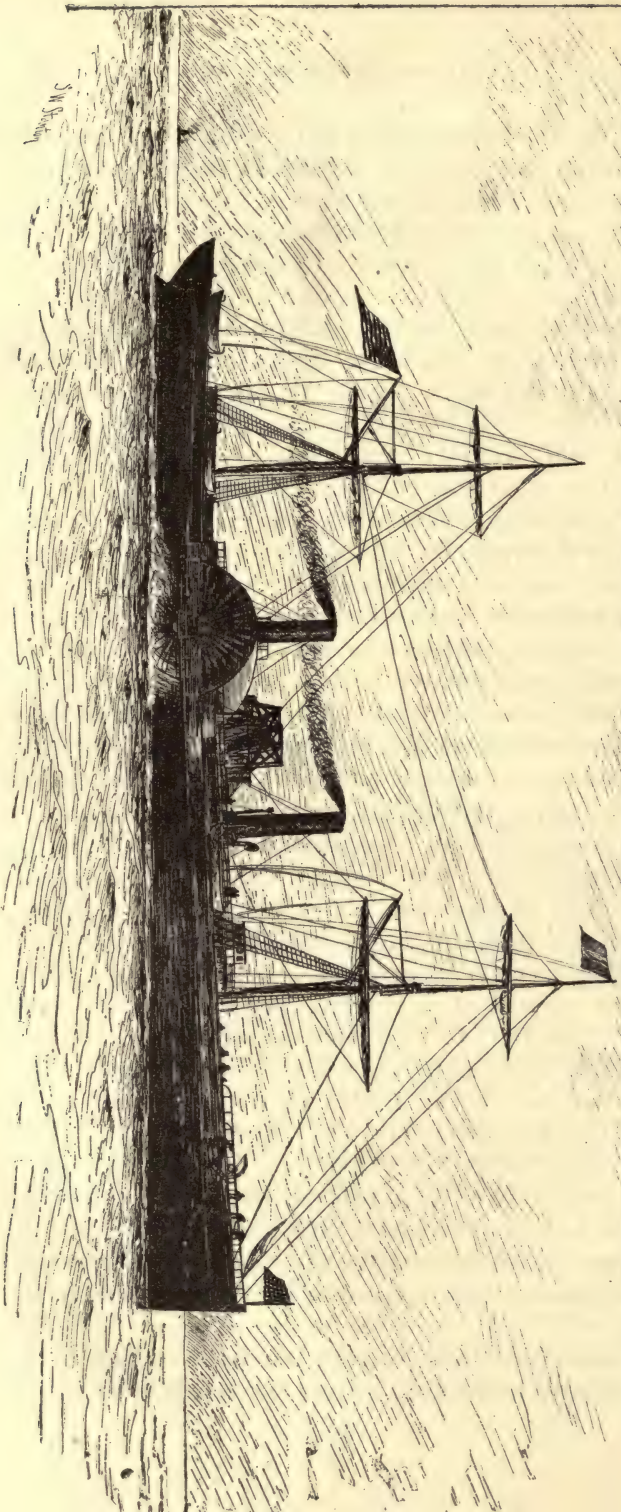
“Novelty Iron Works.

There never appeared in the public journals any denial to these statements in the letter of “Britannicus,” on the part of the proprietors of the Allaire Works, who constructed the engines for the “Pacific” and the “Baltic,” but Mr. Chas. W. Copeland, who was the consulting and superintending engineer of these works at the time of the building of the engines for these vessels, has denied to the author of this work, in decided terms, the broad assertions made in the English journal, and said that many of the drawings of the principal parts of these engines were made by his own hands, and that he neither received nor asked for any advice or suggestions from any engineer from the Clyde or other part of Great Britain, in the designing of these engines, and that they were the work of American engineers in design and construction. And the material of which they were made was of domestic manufacture throughout the whole list.

The first American *screw* steamships to cross the Atlantic were the “Pioneer,” from New York to Liverpool, in October, 1851, and the “City of Pittsburg,” from Philadelphia to Liverpool, in December, 1851, for the Philadelphia, New York and Liverpool Co., or, as afterwards known, the Inman line. This was but a few months after the line had begun operations. The “Pioneer” made but two voyages across to Europe, and the “City of Pittsburg” not many more, for during the next year they were in service on the Pacific Ocean during the gold excitement. The dimensions of the “Pioneer’s” hull were 230’x42’x31’, while the “City of Pittsburg’s” were 245’x38’x33’. Each vessel was fitted with a pair of vertical direct-acting Trunk engines, having cylinders 84”x51”, with a propeller 16 feet in diameter. The vessels were far from being a success, their engines proving very expensive to run and costly in repairs.

In 1853 the steamship “Ericsson” was built at New York by a few New York capitalists, to test the principle of using

STEAMSHIP "VANDERBILT."



hot air instead of steam as a motive power. She made a trial trip to Washington during the following winter, when she developed an average speed of 8 miles per hour upon a consumption of 5 tons of coal, in 24 hours. This speed not being sufficient to compete with fast steamers, the capitalists were not willing to invest in the enterprise for any further experiments; so these engines were removed and a steam engine and boilers were erected in their place, after which the vessel did creditable service in the Collins line for one year, then in the Bremen line, and was used as a transport during the Rebellion. She was subsequently sold to parties in Boston, after her motive power had been removed, and was fitted as a sailing vessel for the East India trade.

In February, 1855, Commodore Vanderbilt made a proposal to the Post Office Department to run a semi-monthly line between New York and Liverpool, to alternate with the Collins line, and asked \$15,000 a trip if he might confine his steamers to the average speed of the Cunard line, or \$19,250, if they were expected to make as good time as the Collins steamships had made; the contract to be for five years. Congress refused the proposal after considerable discussion on the subject. During this year Vanderbilt placed the "North Star," a vessel built in 1852, of 2,800 tons, and known as his yacht, with the "Ariel," then a new vessel of about 2,000 tons, on the route to Southampton and Havre, and again proposed to make a mail contract with the United States Government, his proposal being \$16,680 a voyage, the same compensation as paid by Great Britain to the Cunard line, but he was again unsuccessful. These two vessels run until November of that year, when withdrawn for the season. In 1856 he run the "North Star" on the Bremen route, for two voyages only. During 1857 the "Vanderbilt," the "Ariel," and the "North Star" were running to Southampton and Bremen until December of that year. It had been found by this time that ocean steamers fitted with the beam engine were not so well adapted for the heavy weather of the North Atlantic as those with their engines more concentrated in the hold of the vessel.

The "Vanderbilt" was constructed in 1856, by Jeremiah Simonson, at New York. Her dimensions were: Length on deck, 331 feet; beam, 37 feet 6 inches, and depth of hold, 24

feet 6 inches; loaded draught, 19 feet 6 inches. Frames 21 inches and sided 15 inches, and 32 inches from centres, and braced with iron straps 5 inches by $\frac{3}{8}$ -inch double. There were four water-tight compartments. The vessel was fitted with two vertical beam engines, having cylinders of 90 inches diameter and 12 feet stroke each, built by the Allaire Works; with four return tubular boilers, and two smoke chimnies, 40 feet high and 8 feet 8 inches diameter each. The water-wheels were 41 feet diameter and 10 feet face.

In the latter part of 1857 the "Washington" and the "Herman" were withdrawn from the European trade. In 1858 Vanderbilt run the "Ariel," and for a short time the "North Star" to Southampton and Bremen until November, and the "Vanderbilt" and the "North Star" from April until November to Havre and Southampton. None of these vessels run during the Winter and Spring of '59, until the following May, when the "Vanderbilt," the "Ariel," and the "Ocean Queen," the latter about as large as the "Vanderbilt," but with less power, run to Havre until the winter months. The "North Star" had been transferred to the New York and Aspinwall route, with the "Northern Light" as a consort, as there was plenty of opposition again among the California lines. The "Washington" was now running to Nicaragua, connecting with the "Herman" on the Pacific side. During 1860 the "Vanderbilt" and the "Illinois," the latter built by George Law for the mail line to Aspinwall, in 1851, run to Havre until November, having as an opposition the "Adriatic," while the "Fulton" and the "Arago" had been running during every month in the year all these years, being well patronized by the American traveling public. The last voyage of the steamers of this line was made by the "Arago," leaving New York March 30th, 1861.

The "Vanderbilt" was chartered by the government as a transport for three months in 1861, at \$2,000 per day, and in March, 1862, was made a present to the United States government through the President, at a time when they were in need of staunch and fast sea-going steamers. Her deck houses were removed, and guns placed on board, and especially prepared with the purpose of running down the "Merrimac," but the "Monitor" finished up that duty without any aid in the

destruction of the vessel. The "Vanderbilt" subsequently did good and effective service during the Rebellion searching for Confederate privateers, having been transferred from the War Department to the Navy Department, in September, 1862. At the close of the conflict the vessel was ordered to the North Pacific squadron, where she was employed until 1868, and from which time she was laid up at the Mare Island Navy Yard. In December, 1872, she was appraised at \$84,800, and sold to George Howes, April 18th, 1873, for \$42,000, who, having removed her machinery, converted the hull into a sailing vessel under the name of the "Three Brothers."

The larger number of Commodore Vanderbilt's steamships—if not all—were afterwards sold to the Atlantic Mail Steamship Co., that made such a splurge for a few years and then went by the board. All of his ocean-going vessels had beam engines, some single and some double engines. It was thought when the "Vanderbilt" was a new vessel that it was the fastest ocean steamship running from the port of New York; there was certainly plenty of power in the vessel.

Commodore Vanderbilt received in mail pay of sea and inland postages to Bremen in the fiscal year of 1858, and to Havre in 1859, 1860 and 1861, the sum of three hundred and sixty thousand seven hundred and thirty and $\frac{48}{100}$ dollars (\$360,730.48).

No merchant steamship under the American flag again crossed the Atlantic Ocean until 1866, when Ruger Bros. and associates, of New York, composed of W. H. Webb, E. W. Barstow, and others, started the North American Lloyds, which company purchased the steamships "Atlantic," the "Baltic," and the "Western Metropolis," and at times chartered the "Ericsson," the "Merrimac," the "Mississippi" and the "Northern Light," running them between New York and Bremen, touching at Southampton both ways. This enterprise proved a failure. In 1867 Ruger Bros., with other associates, formed the New York and Bremen Steamship Company. The "Atlantic," the "Baltic," and the "Western Metropolis" were placed in service, with the "Northern Light" as a chartered vessel, and these four steamships run between New York and Bremen, but with no better results than attended the other company. In 1868 Ruger Bros. chartered the

"Arago," the "Ariel," the "Circassian," the "Northern Light," and the "Quaker City," and run them to Bremen, via Southampton and Havre, but they proving to be expensive vessels to run—large consumers of fuel for the power—the line was withdrawn, and the trade left in the hands of the North German Lloyds. In 1869 Ruger Bros. chartered the "Ariel," "Fulton," the "Guiding Star," the "Northern Light," and "Santiago de Cuba," placing them on the route between New York and Stettin, Copenhagen and Christiansand for one trip each, and met with but very indifferent success. Next year they chartered the "Ocean Queen" and the "Rising Star," and run them for one trip only. This voyage of the "Rising Star" was the last under the American flag until the formation of the American line, in 1871.

In 1871 the Pennsylvania R. R. Co., desirous of increasing the import business coming to their railroad, was the means of the formation of the American line of that year. The company was organized with a capital of \$2,500,000, and a contract was made with the Cramp Shipbuilding Company for the construction of four first-class iron steamships of 3,000 tons each, and to have an average speed of thirteen knots an hour. The steamers were intended to carry the mails and conduct a general freight and passenger business between Philadelphia and Liverpool, calling at Queenstown. The "Pennsylvania," the pioneer vessel of the line, was launched in August, 1872, and made her first voyage in May of 1873. The "Ohio," the "Indiana," and the "Illinois" followed at regular intervals. They were 360 feet long, 42 feet beam, and 33 feet depth of hold. As respecting the speed of the vessels, their time compared very favorably with the best voyages at that time. It was in the "Indiana" that General Grant, on May 17th, 1877, took his departure from Philadelphia on starting upon his trip around the world.

Average time, American line, Cape Henlopen to Queens-town, during 1875, '76, '77 and '78 were:

Eastward.	D. H. M.	Westward.	D. H. M.
1875.....	9.15.26	1875.....	10.21.38
1876.....	9.08.48	1876.....	10.10.11
1877.....	9.11.53	1877.....	10.03.02
1878.....	9.10.48	1878.....	10.03.41

In 1884 the steamers of this line ceased running as an American line, having passed into the hands of the International Navigation Co., incorporated in May, 1871, by the State of Pennsylvania, or Red Star Line, which absorbed the Inman line in 1886, that had run between New York and Liverpool since 1856.

The present American line is the result of an Act of Congress of May 10th, 1892, providing, with other conditions, that certain foreign-built steamships should receive American register, on condition that steamships of corresponding tonnage were built in the United States. This led to the "City of Paris" and the "City of New York" receiving American registers in 1893, and their names were then abbreviated to "Paris" and "New York." Contracts were made with the William Cramp S. & E. Bldg. Co. for two steamships as provided for in the Act of Congress referred to, and in 1894 the "St. Louis" was launched, and in the following year the "St. Paul" was launched. These vessels had the first quadruple expansion engines built in the United States for the Atlantic service. As the Red Star line, the company have a large fleet of steamships of foreign construction, mainly running to Antwerp.

The "Paris," while on a voyage from Southampton, England, to New York, on the morning of May 21st, 1899, ran ashore at Lowland Point. No lives were lost nor personal injury caused by the accident. The vessel remained in that position until July 11th, when taken to Milford, via Falmouth, and arrived at the former port July 15th, and was there placed in dry dock August 23d. A few months later, after being temporarily repaired, the vessel was towed to Belfast, Ireland, at the works of Harland & Wolff, where the hull was rebuilt and mostly new engines and boilers fitted in the vessel. The shape of the vessel was so altered in rebuilding as to include the main shafts of the twin-screw engines inside the hull for the greater portion of their length. Her name was then changed to "Philadelphia," and she was placed in commission in the latter part of 1901. The "New York" has been in the dry dock at Brooklyn, N. Y., since the fall of 1901, for several months, with the same rebuilding of the after part of the hull as the "Paris." These two vessels, with the "St. Paul"

and the "St. Louis," were chartered by the Navy Department during the Spanish and American War of 1898, as auxiliary cruisers, the two former being known as "Yale"x"Paris", and "Harvard"x"New York." The "St. Louis" and the "St. Paul" the Navy Department paid for each \$2,500 a day, while for the use of the "Paris" and the "New York," \$2,000 a day for each vessel while in the service.

The record passages of the vessels of the American line from Southampton to New York are: "Paris, July 15th, 1893, 6 days 9 hours and 37 minutes; "New York," September 8th, 1894, 6 days 7 hours and 14 minutes; "St. Louis," August 1st, 1896, 6 days 2 hours and 24 minutes; "St. Paul," August 8th, 1896, 6 days 0 hours and 31 minutes.

From Cherbourg, "St. Paul," August 30th, 1900, 6 days 7 hours and 52 minutes; "New York," August 25th, 1900, 6 days, 18 hours and 57 minutes.

In the subsidy war in Congress of 1855 and '56, the Cunard line was in the front, with the German lines bringing up a good rear for the protection of the interests of the foreign transatlantic lines, while the present subsidy measure is opposed by the German lines as the advance guard, while the English lines are not so prominent in their apparent opposition as in the former case.

COASTWISE STEAMSHIP LINES.

The first coastwise voyages by steam vessels were of those that had been built in the Northern States and sent south for service. They were comparatively very small vessels. After the short voyage of the "Phenix," in 1809, the "Sea Horse," the first American beam-engine steamboat, left New York for New Orleans, La., and arrived there on February 6th, 1819, in 13 days. It is altogether probable that this vessel remained until worn out in southern waters. Then there was a "steam schooner," or a steam vessel rigged as a schooner, for they were generally rigged with masts and sails at that period, named "Ramapo," that left New York, January 4th, 1819, and arrived at New Orleans February 25th, 1819. She was de-

stroyed by the explosion of her boiler in March, 1826. Philadelphia, Pa., supplied some experiments of early sea-going vessels in the "Maid of Orleans," a three-master, leaving December 3d, 1818, for Mobile, Ala., and arriving there January 21st, 1819, to run between Mobile and New Orleans. She did not remain there very long, for she was destroyed by explosion of her boiler during the same year, while on the Savannah River, Georgia. There was also sent at the same time from Philadelphia, the "Mississippi," but she was in so much trouble on the way that she did not arrive at her destination for several months. Then Boston parties sent a small steamboat, named "Mobile," of 150 tons, that was 37 days in the voyage to Mobile, Ala., on January 21st, 1819, to run on the Alabama River. The largest of them all was the "Manhattan," schooner rigged, of 450 tons, built by a company at New York City, and sailed from that city on November 3d, 1819, with nine passengers and a full load of freight for New Orleans, La., and Louisville, Ky., and arrived at the former city on November 27th. She left for Louisville, but, owing to ice and low water in the rivers, was a long time making the trip. She was again at New Orleans in the following March, and here her record ends. There were during the year some four or more small steam vessels that also tried the voyage to the Gulf of Mexico. None of the speculations in sending low-pressure engine steam vessels to southern and western rivers seem to have been a success. There was a steamboat built at Baltimore, Md., in 1818, to run from Havana to Matanzas, Island of Cuba, and upon her arrival, in January, 1819, at the former port, "astonished the natives." This was probably the first steam vessel that had been in Havana waters. There was a steam sloop, named "Albemarle," in December, 1818, and for a few voyages, that run between New York and Wilmington and Edenton, N. C.

The steam brig "New York" was built at Norfolk, Va., by W. A. Hunter, and launched May 22d, 1822, of 281 tons. She was owned by her builder; Richard Churchwood, her captain; Geo. Rowland, Thos. B. Rowland, and others. She was fitted with an engine of 50 H. P., that was one of the early beam engines, built by Daniel Dod, of Elizabethtown, N. J., who built several about this time, some with wooden beams. The "Maid

of Orleans" was another. The "New York" began her service between New York and Norfolk in September, 1822, and continued it, with the exception of a portion of the winter, till October, 1823, when withdrawn from the route, the vessel proving more expensive than the sailing vessels to operate, and not making on an average any better time. She went ashore in a dense fog on October 10th, 1823, near Cape Henlopen, and it was thought at first that her chances for getting afloat once more were very small, but in a few weeks she was in her native element again. She was sold in the spring of 1824, to close up the interests in the enterprise, and, after a short service around New York, taken to the coast of Maine. She was again running from New York to Norfolk for a short time in 1825, and returned to the coast of Maine in the fall of that year.

The first steam vessel built for the ocean service was the "Robert Fulton," constructed by Henry Eckford, at New York, in 1819, for David Dunham & Co., for the trade between New York and the Island of Cuba, touching at Charleston, S. C., and New Orleans, La. The hull of this vessel was 158'x33'x15' deep, with 10 feet draft, having paddle wheels 24 feet diameter. The motive power was a "square engine" of 44 inches cylinder by 5 feet stroke, built by the Allaire Works. The connecting rods operated cog-wheel cranks on the water-wheel shafts, gearing into cog wheels on a flywheel shaft, the wheels running on each side of the cylinder. The boilers were of copper, placed forward of the engine, with two smoke chimnies, placed side by side in front of the gallows frame. The engine of this vessel was constructed under the supervision of a Mr. Jasper Lynch, who had acquired his knowledge of the steam engine while in the employ of Robert Fulton. It is thought that Cadwallader Colden and Henry Eckford were interested in the building and operation of this vessel with Henry Dunham. Her time was about, New York to Charleston 4 days, Charleston to Havana 4 days, Havana to New Orleans 3 days.

This vessel was a success as a sea-going steamer, having encountered at times very severe weather without any serious damage. Left New York on her first voyage April 20th, 1820. After running for about five years, the business was found to be not sufficient to make the enterprise a success financially,

and the line was abandoned. Mr. Dunham dying in 1825, the vessel was sold to the Brazilian government, after the machinery was removed, and was finally wrecked on the coast of Brazil.

X The first coastwise steamers in use after the "Savannah" and the "Robert Fulton" were those from New York to Charleston, S. C. They were not steamships as we have had since 1846, but were similar to those then on Long Island Sound, with the exception that their guards in some cases were not run so far forward and aft of the water wheels, and with their boilers in the hold of the vessel. These vessels were known as steam packets. The first of these vessels was the "David Brown," built in 1832, for J. P. Allaire, to run to Red Bank, N. J., to transport the ironware from his Howell Iron Works to New York. She was a small vessel, being but 136'x18'x8'3, and run to Red Bank for a few months, when, in November of 1832, she was placed in the coastwise service. Small as she was for such a long route, she remained there for two years, until the larger vessels were built, when, in 1835, she was run between New York and Norfolk, Va. X This vessel was shortly after sold and sent to the West Indies, where she was worn out about 1845. Prior to running coastwise, there was a frame protection built under her guards, that subsequently on other vessels developed into sponsons. In 1833 the "William Gibbons" was built for the same parties, of increased dimensions, and run with the "David Brown" a part of the time until lost on Body Island, on the coast of North Carolina, in October, 1836. A change had, prior to this come in the ownership of the vessels. The principal owners were J. P. Allaire, John Haggerty, and Charles Morgan, the latter managing director of the line. It was known as the Southern Steam Packet Company. A year after the "William Gibbons" was built, Charles Morgan and others had built the "Columbia," to run on the same route, a vessel larger than the others. This vessel was 177'x22'x10', with a square engine of 56"x6', and had, so far as known, the first staterooms on a vessel on the coast. There were four on the promenade deck, with two berths in each. After the "Gibbons" was lost, J. P. Allaire had another vessel constructed that was larger than any of her predecessors, being 212'x22'x12', with a "square" engine of

56"x9 feet, and named the "Home." It will be noticed the narrow beam for her length. There is every reason to believe this was the first vessel in this country with sponsons under the guards. All the machinery for these vessels were built at the Allaire Works. This vessel was lost on her third voyage to Charleston on November 9th, 1837, during a north-east gale, going ashore near Cape Hatteras, with the loss of about one hundred lives. The disaster to this vessel was the main cause of making it an unprofitable investment in employing that class of steam vessels on a coastwise route. The same year, Charles Morgan and others had another vessel built about the same size as the "Columbia," named "New York," and was running with the former when the "Home" was lost. Allaire's company had another vessel of about same length built, but much heavier, to stand the shock and strain of heavy weather, but not a steamship for all. This was the "Neptune."

These vessels run more or less for about three years, when withdrawn from the service in 1839. They run but eight or nine months in a year, laying up during the winter months, and carried passengers and light freight or express matter only. Their successful operation may be attributed partly to the use of anthracite coal under the boilers. Whether by natural draught or by blowers, no record has thus far been found. In the height of their prosperity it was claimed that they cleared from \$1,000 to \$2,000 a trip, and during the spring and fall seasons the vessels were often too crowded with passengers for safety in case of abnormal conditions arising. The "Columbia" and the "New York" were sent in 1838 by Charles Morgan to New Orleans, where they became the pioneers of the Morgan line in the Gulf of Mexico, running from New Orleans to Galveston, Texas. The "Neptune" was sold to Texan parties, but in a few years was in northern waters again.

How those vessels, with the exception of the "Neptune," could run for six consecutive months on the coast without meeting with the fate of the "Home" is surprising, unless they run for a harbor at the first hard blow and remained until it was over. When we read of the vessels that went around Cape Horn to California in 1850, on another page, it seems as though there was not so much risk for these vessels, but Cape

Hatteras is a locality for a light built vessel in heavy weather to avoid.

W. C. Redfield, an engineer of New York, in 1842, says regarding the loss of the "Home":

"This unfortunate vessel was constructed and equipped by Mr. Allaire, an enterprising engineer who had been engaged in the construction of engines and steam vessels almost from their first introduction. With a mind apt to appreciate the means necessary for safe navigation, he had ventured some years previous to this period, to equip and send forth the "David Brown," a truly American steamer, upon the waters of the Atlantic, which, notwithstanding the fears and predictions of nautical men, proved an excellent and sea-worthy steamer.

"Two other vessels were successfully placed on the route from New York to Charleston by Mr. Allaire and his associates, each winning additional confidence and applause from the observant navigator. One of these vessels having been lost by error of the pilot, a third and still superior steamer was placed upon the route, replete with every improvement of proportions, strength and equipments which years of experience in this navigation had suggested, and so entirely assured was the owner of her seaworthiness that no insurance was applied for, except on a fraction of her value, for the particular benefit of a private creditor. This vessel was the ill-fated "Home."

"The 'Home' had, of course, been condemned in advance by certain nautical prophets, as has been common in all early attempts at ocean steam navigation, and on the completion of her first voyage was greatly traduced, through the ignorant misapprehensions of passengers and others, many of whom had mistaken the arched form which had been given to her deck for its greater strength, and which was most strikingly visible at two points, forward and aft of the centre, which, viewed in connection with the usual depression of the wheel guards at midships, was taken as a conclusive evidence of that injurious strain which is designated by the term *hogged*. Another effective scarecrow had also been found in a single set of bearing braces above the gunwale, on each side, which

were intended to distribute more extensively a part of the weight of the engine and boilers. These braces, however, being placed at a very low angle, broke loose from their shoe or socket on the deck at their forward ends, by the elastic movement of the vessel in a heavy sea, as might reasonably have been expected, causing a slight dislocation in some light work above the deck which had been attached to these braces and which formed the enclosure of an upper state-room on the guards, occupied by a passenger. This trivial accident on her first voyage caused considerable fright among timid persons, and the laying of a foot-mat over the end of the dislocated brace, while in Charleston, was construed into an act of desperate treachery to the lives of the traveling public.

"On arriving at New York on her return voyage, the vessel was strictly examined by her builder, and except this harmless matter, and the loosening of a small piece of plank on one of the extraneous spondings, everything was found in perfect condition.

"The second voyage of the "Home" was made without any notable occurrence; but on leaving port on her third and fatal voyage, she was soon overtaken by a north-east gale, and meeting with an injury in a feeding pipe of one of her boilers, she bore up for the Chesapeake. This injury having been temporarily repaired, she then stood on for Cape Hatteras; but, owing to the previous alteration of her course, made the land about sixty miles northward of the Cape—the sea at this time being heavy and the gale increasing. Steering now nearly in the trough of the sea to weather the Cape, the "Home" passed over the Wimble Shoals, on which the sea was then breaking with great fury, and three of the rollers broke on board, so far only as to dash inward one of the gangway boards on the outside of the guards, abaft the water wheel, together with two or three of the sash windows of the light-built saloon cabin which occupied the greater part of the after deck; and this small affair was the only thing, like the boarding by a sea, which occurred to the "Home" during the whole of this trying occasion, till she was partially water logged and finally, though unwisely, run into the breakers of the outer sand-bar on the coast of North Carolina.

"After passing the Wimble Shoals, the "Home" had been headed up still more to the eastward, in order to weather the Hatteras Shoals, and shortly before passing these Shoals was discovered to have sprung a leak. Much search was made for the mysterious leak, but without success. It, of course, happened that the overhead braces of the "Home" again broke loose in this gale at the same point as before, and to this circumstance, and to the elasticity necessarily and properly manifested in a vessel of her length in a rough sea way, much of the unreasonable panic is to be ascribed which had early manifested itself among the passengers. As the elasticity shown by the "Home" was naturally associated in the minds of the passengers with the dislocation of the braces, and was more particularly noticed by them at this point, this motion was considered by many as having caused the subsequent leak and disaster by straining the sides. I have since had the satisfaction of examining a portion of the wreck of the "Home" on the beach, comprising one of her sides and the forward body, the point where the greatest bending was represented as having been seen, and to my surprise I was unable to detect the slightest opening or defect in the seams or butts of the outside planking.

"Captain Crane, who commanded the steamer "Savannah" which was lost in a gale off Cape Hatteras on November 28th, 1841, ascribes the loss of that vessel, conjecturally, to the dislocation or fracture of one of the large discharging pipes which communicated from the engine through her bottom, and this opinion is probably correct. This appears to be the only probable solution of the loss of the "Home." It is known to many that the "Home," "Savannah," and other steam vessels of that period, were fitted most unfortunately with discharging pipes of *cast iron*, an undoubted oversight which renders the above conjecture sufficiently probable."

That the vessel was unsuited for coastwise employment is shown by the evidence of the officers and passengers saved from the wreck, who stated that it was not over twenty minutes after the vessel struck the shore before she went to pieces.

X There was also between Baltimore, Md., and Charleston the "South Carolina," of 466 tons, built in Baltimore in 1836 and owned by the Atlantic Steam Company, as well as the

"Georgia," belonging to the same company, and on the same route, of 552 tons. There was a line running from Wilmington, N. C., to Charleston, S. C., having two boats of about 180 feet length, built in New York and named "North Carolina" and "Gov. Dudley." Their time from dock to dock was usually 18 to 20 hours.

In 1837 a company in Savannah had built in Baltimore the "Pulaski" for service between Savannah and Baltimore, stopping at Charleston, of 687 tons, the largest of the coastwise vessels at that time. This vessel, when on her third trip from Savannah, on June 14th, 1838, and when about 12 hours out of Charleston, met with a frightful accident from the explosion of one of her boilers, from want of skill by the engineer on duty, the vessel becoming a complete wreck, breaking in two pieces about an hour after the explosion and sinking with the loss of about 110 persons.

There was also running from Philadelphia, Pa., to Charleston the "Charleston," of 570 tons, built in 1836 at Philadelphia. This vessel had a pair of beam engines built by Levi Morris & Co., of Philadelphia, Pa.

After the accidents to the "Home" and the "Pulaski" the public confidence in this class of vessels for sea service seems to have been shaken, so much so that on most of the routes they no longer proved paying investments, and it was not until the "Southerner" was built for the Charleston route from New York, in 1846, that the coasting trade by steam vessels revived, and at this time by *steamships*, which were more suitable for the severe weather they were likely to encounter. The business had become so unprofitable that in July, 1838, the "Nep-tune" was sold at auction in Charleston, S. C.

There was a steamer constructed at Baltimore, Md., in 1837, named "Natchez," by Rogers, Brown & Cully, that was probably more fitted for coastwise service than any other at that period. She was intended for New York to Natchez, Miss., trade, stopping at New Orleans, but was found to draw too much water for the Mississippi River. The vessel was 200'x29'x16', with a beam engine 56"x10 feet stroke, built by Charles Reeder & Sons. She was very heavily constructed and proved a good sea boat. As the vessel was not adapted for the

trade intended, she was, shortly after, sold to one of the South American governments.

The opening of the pioneer coastwise line to Charleston, in 1832, was induced by the prospective development of steam railroads in the Southern States. Prior to the year 1830 there was not a steam railroad below the Potomac River, and but few miles in operation north of that river. The only means of communication between the extremes along the Atlantic coast was by stage coach, excepting for an occasional line of steamers between some of the coast cities. For instance, from New Orleans, La., to New York, the largest travel was by the way from the former city to Mobile by steamboat, thence by stage to Augusta, Georgia, where steamboat was taken to Savannah or Charleston, and thence by land to Norfolk, Va., and here the Baltimore boat was taken. From Baltimore another stage journey to Philadelphia, or Wilmington, Del., to Philadelphia by steamboat, and to Trenton, N. J., by steamboat. Here the stage was again resorted to, and the journey continued in that conveyance to New York, or going to Amboy or New Brunswick, N. J., and there taking the steamboat for New York. There was one other route to be taken, by steamboat on the Mississippi and the Ohio rivers to Pittsburg, and thence by stages. The first of the southern railroads to be placed under construction was the South Carolina R. R., from Charleston to Hamburg, S. C., opposite Augusta, Ga. Ten miles of this railroad was opened in 1830, and in the latter part of 1832 there was 52 miles more of the road in operation, and in 1833 there was an additional 75 miles, making 137 miles in operation a few months after the steam packets began operations to Charleston. The railroad did an increasing business from the time of its opening, and brought to the steam packet line a great deal of through passenger business, that patronized that means of public conveyance on account of the saving in time, as well as for the comfort obtained when compared with the cramped stage coach.

NEW YORK TO CHARLESTON, S. C.

Previous to the introduction of the steamship into our coastwise trade, the communications between the various ports by water were made by what were termed packets—sailing

vessels of from 150 to 400 tons each, rigged as schooners, brigs, or barks, and fitted with accommodations for passengers, besides the carrying of freight. Between the more prominent ports on the coast, these packets were run in lines by established companies, who had regular days appointed for the sailing of their vessels.

X From about 1840 the question of a more rapid and certain intercourse between the coast cities began to be agitated, as the slow and uncertain packets were often detained on their voyages by calms and fogs, thus delaying the passengers en route, and often putting merchants in despair by the non-arrival of merchandise that was much wanted for consumption. X Probably what gave a stimulus to the matter was the contract made by the Post Office Department of the government for the transportation of the mails to foreign countries, March 3d, 1845, as it was under this act and that of March 3d, 1847, that the mail was carried to foreign countries and the Southern States by steam vessels.

Spofford & Tileston, of New York, were shipping merchants of that city having a large trade with Charleston, S. C., and Havana, Cuba, that was served through a line of packets they had run for many years. About 1844 the subject of a steamship to run between New York and Charleston was discussed between the firm and a few Charleston capitalists, with the result that in 1845 it was determined to build a vessel of about 800 tons. A contract was entered into with William H. Brown, of New York, to build the hull, and the Novelty Iron Works, of the same city, to construct the machinery. The hull was 191 feet long, 30 feet 8 inches beam by 14 feet deep, with a "side-lever" engine, 67-inch cylinder by 8 feet stroke, operated under a steam pressure of 15 pounds to the square inch. This was the same type of engine as used in the Collins steamships a few years later. This vessel had a wide square stern and a very full bow, with other features that, taken as a whole, would not pronounce her a nautical beauty. One authority said her stern was like the side of a house. There were many changes in the next few years in the form of our ocean steam vessels. The opening of the many lines on the Atlantic Ocean and the Pacific Ocean called for the construction of many vessels for

the several lines, and almost every vessel built was a great improvement upon those preceding it.

This pioneer vessel of our coastwise trade was named the "Southerner," and sailed from New York on her first trip to Charleston, S. C., on September 13th, 1846, arriving there after a period of 59 hours. Her date of sailing was about every 14 days from New York until the "Northerner" was finished as a consort, her initial trip being made September 29th, 1847. The latter vessel was somewhat larger and had more power than the "Southerner." Such were our two first coastwise steamships.

The line had the benefit of a contract in carrying the mail, through M. C. Mordecai, a merchant of Charleston, S. C., who received for ten years, for carrying the mail to Charleston, Savannah, Key West, and Havana, \$50,000 per year for seven years, and \$60,000 per year for three years, the contract ending in 1860. The same parties also run the "Isabel," that was of about the same size as the "Southerner," between Charleston, Key West, and Havana, for several years. This vessel was a blockade runner during the Civil War, and known as the "Ella Warley." The "Northerner" was sold for service on the Pacific coast in 1851, and was wrecked when on a voyage to San Francisco, on January 5th, 1860. The company subsequently built the "Marion," of about the same dimensions as their second steam vessel, and the "James Adger," in 1852, that was of increased dimensions and more power.

One of the finest vessels they had on the line was the "Nashville," built in 1853. The hull was constructed by William Colyer, of New York, and her machinery by the Novelty Iron Works. This vessel had more power than her predecessors, and was about the best in the coastwise lines at the time. She was detained at Charleston just previous to the secession of the State of South Carolina, and during the War of the Rebellion was one of the two domestic steamers that became privateers of the Confederate Navy; the other was the "Sumter" x "Habana", built in 1859 at Philadelphia, Pa., a propeller in the merchant service between New Orleans, La., and Cuba, prior to her naval career. The ironclad monitor "Montauk," that was one of the blockading squadron off the mouth of the Ogeechee River, in Georgia, finding the "Nash-

ville" was ashore in the river above Fort McAllister, went up the river as far as the obstructions opposite the fort, and shelled the "Nashville," on February 27th, 1863, and in less than an hour she was a mass of smoking ruins. In 1857 the company added to their line the "Columbia," built at New York, a duplicate almost of the "Quaker City."

In 1854 a fine new steamship was completed, that in after years gained a wide reputation, named the "Quaker City."* This vessel was built at Philadelphia, Pa., by Vaughan & Lynn, having a "side-lever" engine, 85"x8'; the hull of the vessel was 227'x36'x21', and the machinery was constructed by Merrick & Sons. This vessel was in service between Philadelphia and Charleston, S. C. The same year the "State of Georgia" and the "Keystone State" were also on the same route, where they continued for three or more years.

In 1859 the New York and Charleston line was composed of the following steamships, viz.: "Columbia," "Nashville," "James Adger," "Marion."

When the Civil War commenced, in April, 1861, all the vessels of this company, except the "Nashville," were under the control of their New York representatives.

The "James Adger" was purchased by the Navy Department for the blockading service, for \$85,000, and sold by the Department in 1866 for \$32,000.

There were no merchant steamships in the peaceful pursuit of commerce to the port of Charleston, S. C., from the firing on Fort Sumter, until May, 1865, when Arthur Leary had two propellers running from New York, and the next two years the "Quaker City" and the "Saragossa." In 1867 the New York and Charleston S. S. Co., which was composed of New York and New Orleans capitalists, started a line of side-wheel steamships, and among the vessels run up to 1872 were the "Manhattan," the "Champion," and the "Charleston." The "Manhattan" was then a new vessel built in 1866, the "Champion" was the iron-hull double-beam-engine steamship built for Com. Vanderbilt in 1859, by Harlan & Hollingsworth Co.; and the "Charleston" was the "James P. King," built for Spofford &

* Her voyage to the Mediterranean Sea with the "Innocents Abroad" was made in June, 1867.

Tileston, in 1860, was burned, then rebuilt as the "Eagle," and sold to the Navy Department, who changed her name as one of the blockading squadron to the "Rhode Island." The "Monitor" foundered at sea while in tow of the "Rhode Island," on December 31st, 1862, just south of Cape Hatteras. In 1872 Wm. P. Clyde entered the New York and Charleston trade with the "South Carolina" and the "Georgia," in combination with the other line. South Carolina R. R. Co. is believed to have had an interest in both of these lines of steamships at this time. The "South Carolina" was originally built for the Navy Department, at Boston, Mass., but not completed until after the Civil War; was an iron-hull double-ender. The "Georgia" was one of the same type, built at Chester, Pa., and was formerly "Shamokin." The "South Carolina" afterwards had side wheels and engines removed, and was fitted with a propeller engine. This line was known as the New York and South Carolina S. S. Co.

The New York and Charleston S. S. Co. subsequently built two propellers, the "City of Atlanta" and the "City of Columbia," the latter being the ill-fated vessel that started from New York during the late Klondike gold excitement, with a large passenger list for Seattle, Wash., but never reached there on account of her unseaworthy condition, before she was half way to her destination. The side-wheel steam vessels having been disposed of, the propellers of this company, with the steamers of the Clyde line, served the interests of the route until about 1885, when the New York and Charleston S. S. Co. closed up their business and sold their remaining vessels. This left the Clyde line in possession of the business by water between the two ports, and in 1886 they began the construction of a fleet for that service, the first of which was the "Seminole," followed by the "Cherokee" the same year, the "Iroquois" in 1888, the "Algonquin" in 1890, the "Comanche" in 1895. All these vessels have triple-expansion engines and were among the first with that type of engine in our coastwise service, with the exception of the "Comanche," that has quadruple-expansion engines. The "Iroquois" and the "Comanche" were each lengthened 50 feet in 1901; and during the same year their fleet was increased by the addition of the new steel vessels, the "Apache" and the "Arapahoe." The "Comanche" has thus far

made the best time between the ports. In 1902 the "Apache" and the "Arapahoe" were each lengthened about 40 feet.

A short history of the development of the triple-expansion engine for marine use in this country is contained in the following items. The pioneer vessel in this country having the triple-expansion engine was the steam whaler "Balaena," whose machinery was built by the Risdon Iron Works at San Francisco, Cal., and the vessel sailed on her first voyage April 28th, 1883. The cylinders were 12" and 20" and 32" by 24 inches stroke. In 1884 the Goss Marine Iron Works of Bath, Me., put a triple-expansion engine in the experimental vessel "Meteor," the original engine having been removed, the cylinders being 15" and 23 $\frac{3}{4}$ " and 37 $\frac{1}{2}$ " by 26 inches stroke. The trial trip with the new engine was made in the latter part of the year. In July, 1885, the Cramp S. & E. B. Co. completed the next vessel with the same type of engine, that at this time was known as the shop number "246." Her first service a few days after completion was in the regatta on Long Island Sound of steam yachts. Her cylinders were 17 inches and 24 inches and 40 inches by 20 inches stroke. Some months later the vessel was sold and named "Peerless." Then came the "Mascotte," the "Sappho," "Seminole," the "Cherokee," and the "Olivette," all built by the Cramp S. & E. B. Co., with the exception of the "Sappho," that was built by the New England Shipbuilding Co. within 18 months after the "Peerless."

SAVANNAH, GA.

Communication with Savannah, Ga., before the service by steamships to coastwise cities was by the sailing packets, but in the fall of 1848 the New York and Savannah S. S. Co.—Mitchell's line—began running the "Cherokee" from New York. The "Cherokee's" first trip was made September 13th, and the "Tennessee's," her consort, early in the spring of the next year. They were about 1,500 tons each, built by Wm. H. Webb, and their machinery was constructed by the Novelty Iron Works. These vessels were run but a year or two when they were sold and put in service on the California route, the "Tennessee" going to the Pacific coast.

In an advertisement of the Savannah line, in 1848, there is found this recommendation for the line:—"The ships of this line carry a clear white light at masthead, green on starboard side, and red on larboard." This was previous to the present steamboat law in its original form. The law in force in 1848 merely required "to carry of one or more signal lights that may be seen by other boats navigating the same waters." The rules and regulations of the supervising inspectors under the law of 1852 required these colored lights, but it was not incorporated into the law until later. There was a custom on the Northern lakes for the steam vessels to carry their colored running lights in a manner like those on the Savannah steamers prior to the establishment of that line.

The "Isabel," from Charleston, S. C., was the only coastwise steamship for a time calling at Savannah until the Mitchell line was again in operation in 1850, when the "Florida" was completed and made her first trip on September 24th of that year, the "Alabama" in January of 1851, and in 1852 the "Augusta" was added. Passenger fare, \$25.00.

Previous to the steam lines there were six packet lines to Savannah. The "Old Established" line, leaving every Thursday from opposite ends of the route; the "Brig" line, leaving on Monday; and the "New" line, leaving every Tuesday to New York. There was also a line to Philadelphia, Pa., and one to Boston, Mass. Thirty-eight ships, barks and brigs arrived at Savannah during the month of the opening of the steamship line.

The steamships of the Mitchell line were well built and of fairly good speed for that day, but the best of the fleet was the "Knoxville" that was built also by Wm. H. Webb in 1853. This vessel had a little more power of her engine than the other vessels of the line and was considered to be the second-fastest steam vessel on the coast at that time. When but three years old she was burned to the water edge while lying at her dock at New York on December 22d, 1856, becoming a total loss. In 1857 the "Star of the South," a propeller, was added to the line.

In 1858 the Cromwell line was opened to Savannah with the "Montgomery," and the next year the "Huntsville" was

added, being among the first screw steamships of any size in the coastwise service. This company was known as the American Atlantic Screw S. S. Co. of Georgia and was controlled by R. R. Cuyler, and Brigham Baldwin & Co., of Savannah, Ga., and H. B. Cromwell & Co., of New York. The new line woke up the old company to increased activity and hustle for business, and lively time resulted. In June, 1859, the vessels of the Mitchell line were sold to R. R. Cuyler, president of the Georgia Central R. R. Co., and continued to run to Savannah.

In June, 1860, the "R. R. Cuyler," another screw steamship, was added to the Cromwell line. The hull was built by Samuel Sneed at Brooklyn, N. Y., and was 235'x32'x16'6, and fitted with an engine, built at the Allaire Works, of 70 inches diameter of cylinder by 48 inches stroke. This vessel was a great improvement on the other propellers, both in model and speed, and was spoken of as Cromwell's yacht. Passenger fare had now fallen to \$15.00.

The Navy Department, in 1861, took the following of these Savannah steamships for blockading service, viz.:

"Alabama,"	cost	\$93,388,	sold	when	war	was	over	for	\$28,000
"Augusta,"	"	96,940	"	"	"	"	"	"
"R. R. Cuyler,"	"	165,000	"	"	"	"	"	"	81,000
"Montgomery,"	"	90,000	"	"	"	"	"	"	39,500
"Huntsville,"	"	90,000	"	"	"	"	"	"	33,000

The port was not open to commercial intercourse until May 1865, when the "Catharine Whiting," the "Chase" and "America" were sent to open the trade to that port. As the Civil War had now practically ceased, and as many steam vessels had been constructed during the period of the war to enter the transport service of the government, and these vessels, being free from the government contracts, were seeking employment on the routes that were being opened again to commerce, and to this number might be added several steamships the government had purchased during the war, having no further use for them, they were sold in a very short time after peace was declared. This made a large number in the aggregate, and all seeking for employment. In the

end the best equipped steamships, with good financial backing, secured the most desirable business. It was at this time that the Atlantic Coast Mail S. S. Co. was formed, having a total of about ten steam vessels, and including among their members Livingston Fox & Co., N. L. McCready, and others. Some of the vessels owned by them were, the "Hatteras," the "Albemarle," "Raleigh," "Rapidan," "Gen'l J. K. Barnes," "Herman Livingston," "Flambeau," "Ariadne," "Varuna," "Mon-eka" and "Euterpe." They had two steamers running to Savannah, the "Varuna" and the "Ariadne," small wooden propellers of about 800 tons each. Things run along until 1866, Wakeman & Co. having entered the trade with a line of propellers that did not last more than a year or two, when Garrison & Allen placed the two iron-hull sidewheelers "San Jacinto" and the "San Salvador" on the route, while Livingston Fox & Co. had the "Herman Livingston" and the "Gen'l J. K. Barnes," and a new factor had entered the field, Murray Ferris & Co., with the "Leo" and the "Virgo," two wooden propellers of about 1,200 tons. In September, 1867, the Black Star line, that had been running to New Orleans with the "Huntsville" and the "Montgomery," began operations to Savannah as an independent line, and then a war of rates began that lasted for a few years.

The old lines entered into a combination and through a traffic agreement they had made with the Georgia Central R. R. Company, they were enabled to control all the through freight coming over this railroad, it being the principal road in the State of Georgia. It should be said, at this time the railroads of the Southern States, after the war ceased, were in a low condition financially, and in this instance were controlled in many ways in their relations with the steamship interests by the latter. But as a few years passed, the railroad company extended their line, business increased and they were getting into a better shape materially and financially, and by degrees the percentage of freight charges allowed to the steamship combination was cut down until it no longer remained a paying business for the lines, and Livingston Fox & Co. sold out their interest about 1872, followed later by the other lines—Black Star line having meanwhile been taken in—to W. R. Garrison, who, about 1876,

transferred the remaining vessels to the Georgia Central R. R. Co. They run the "H. Livingston," the "Gen'l Barnes," the "San Salvador," the "Leo," and one or two others, until the first of their iron-hull steamships, the "City of Savannah" and the "City of Macon," were built in 1877 by the Delaware River I. S. B. & E. Works, followed by the "Gate City" and the "City of Columbus" the next year, and in 1880 the "City of Augusta" that was larger than any of its predecessors. The company sold the "Gate City" and the "City of Columbus" to a Boston company for the Boston and Savannah trade in 1882, they having had completed for their New York business the "Tallahassee," the "Chattahoochie" and the "Nacoochie." In 1888 the "City of Birmingham" was added, and in 1889 the "Kansas City," the largest of the fleet to that time and the one that has made the best time on the route. In the last two years the company have added two equally as large vessels, having limited passenger accommodations compared with the others, but large freight carriers.

NEW ORLEANS.

The opening of steamship lines to New Orleans was brought about by the granting of a mail contract to A. G. Sloo on April 20th, 1847, by the Navy Department, to construct vessels to carry the U. S. Mail from New York to New Orleans, touching at Charleston, Savannah and Havana, and from Havana to Chagres, for the sum of \$290,000 per annum. Stopping at Charleston and Savannah was discontinued after about two years. This contract was shortly after assigned to George Law and associates, among the latter being Marshall O. Roberts and B. B. McIlvain. The party to whom this contract was granted had a stage route and mail line in Tennessee, although a resident of Cincinnati, Ohio, and when granted was considered of little or no value. It was only the development of the gold fields of California a few years later that gave it a value.

Marshall O. Roberts was interested at this time as a part owner with J. M. Forbes, of Boston, Mass., in the iron-hull side propeller steamboat "Iron Witch" on the Hudson river, and when the engines were taken out of this steamboat

they were placed in the hull of the first steamship, the "Falcon," that performed the service under this contract, making her first trip in September, 1848. George Law had purchased her from M. O. Roberts and others.

This contract contained some provisions that have been retained in the requirements of the government with our mail steamship companies, and as it was the first contract of this nature it may have its importance as the pioneer. * * * "The said steamship to be of not less than fifteen hundred tons burden, and propelled by engines of not less than one thousand horsepower each, to be constructed under the superintendence and direction of a Naval Constructor in the employ of the Navy Department, and to be so constructed as to render them convertible at the least possible expense into war steamers of the first class. * * * The said boilers and machinery to be of the best quality and to be so placed below the water line as to be as far as practicable beyond the reach of cannon shot. * * * That each and all of said steamships shall be commanded by an officer of the Navy of the United States, not below the grade of lieutenant, to be selected by said contractor, A. G. Sloo, with the approval and consent of the Secretary of the Navy, and to be accommodated on board thereof in a manner becoming his rank and station, without charge to the government of the United States." Also four midshipmen of the United States Navy to serve as watch officers.

J. Howard & Son, of New York, were early in the California trade with the Empire City line, for in the month of October, 1848, they opened the line with the steamer "Crescent City" to the Isthmus, and early the next year with the "Empire City." These were vessels of about 1,500 tons each and built at New York. This line run to Chagres, in opposition to the United States Mail line, until absorbed by the Pacific Mail S. S. Co. in the fall of 1850. Charles Morgan and Isaac Newton were interested in the line at first.

The "United States," built by William H. Webb for Charles H. Marshall & Co. and originally intended for the New Orleans trade, but run from New York to Havre, made one voyage to New Orleans in November, 1848,

The "Falcon" was the only vessel serving under the mail contract in the Law line until the "Ohio," in the fall of 1849, and the "Georgia," a few months later, were completed, and in 1851 the "Illinois." These three last-named vessels were constructed under the immediate supervision of the head of the company. The "Ohio" was built by Bishop & Simonson—the latter was a nephew of Commodore Vanderbilt—, the "Georgia" by Smith & Dimon, who also constructed the "Illinois," their machinery being built at the Allaire Works. They were the largest and finest ocean steamships that had been built for the coastwise service to that time and were looked upon as a credit to the American shipbuilder. These vessels carried the mail and were commanded by officers of the United States Navy, the captain of the "Georgia" at one time being Lieutenant D. D. Porter, afterward Admiral of the United States Navy.

At first the service to New Orleans was by no means regular, as the business offered to the Isthmus of Panama was all the company could care for with the single vessel employed, and it was not until the summer of 1849 when the first excitement had spent itself in travel to the gold regions that the New Orleans business received the attention it deserved. Passenger fare in the cabin at this time was \$150 to Chagres, passenger fare in steamships by way of Cape Magellan to San Francisco in cabin was \$500.

A line was run for a time from Philadelphia, Pa., to Chagres by the Philadelphia and Atlantic Steam Navigation Co. with the steamship "Philadelphia," a vessel of about 1,400 tons, built at Philadelphia, Pa., in 1849. During 1850 the line ceased operations, and the vessel passed into the hands of the Pacific Mail Steamship Co. Previous to this the "Cherokee" and the "Tennessee" had been purchased, the former kept on the Atlantic Coast line and the "Tennessee" sent to the Pacific Ocean for the Pacific Mail Steamship Co.

In the fall of 1850 the Pacific Mail Co. had started an opposition line on the Atlantic coast to Chagres against the United States Mail line; this brought out an opposition by Law and Roberts against the Pacific Mail Co. on the Pacific coast, which contest was waged with a great deal of dash and spirit until April, 1851, when the Pacific coast vessels of

the United States Mail line were purchased by the Pacific Mail Co., the "Isthmus," the "Antelope," the "Republic" and the "Columbus," vessels unfitted for such a service; while the Pacific Mail Co. line on the Atlantic side, the "Empire City," the "Crescent City," "Eldorado," "Philadelphia" and "Cherokee," were taken by Law & Roberts' United States Mail Co. It would seem, in looking back on the many "wars of opposition" on the waters among the merchant marine of the early days, that the participants must in many cases have loved the row for the pure love of fight; that executive ability appears to have been largely developed in some of those interested at the period under review.

From 1851 to 1853 the United States Mail Co. had control of the business on the Atlantic side with the following vessels, viz.: their three fine mail steamships "Ohio," "Georgia" and "Illinois", with the "Philadelphia," "Cherokee," "Empire City," "Crescent City" and "Falcon." In 1853 they lost the "Cherokee" and in 1856 the "Crescent City."

In 1854 George Law sold his interest in the United States Mail Co. to Marshall O. Roberts, who was the controlling owner of the line during its remaining years.

In the same year Livingston, Crocheron & Co., who had been running two well-built and equipped beam-engine steamships, the "Black Warrior" and the "Cahawba," to Mobile via Havana for a year or two under the name of the New York and Alabama S. S. Co., changed the southern terminus of their line from Mobile to New Orleans. This may be said to have been the first exclusive New Orleans line from New York. At the same time Charles Morgan, who had been interested in the commerce between the Gulf ports for several years, had the "Orizaba," "Prometheus" and "Daniel Webster" running to Vera Cruz via New Orleans under a mail contract that lasted for five years. As these vessels had been the property of Commodore Vanderbilt it would seem as though he may have been an interested party in some form. The passing of a controlling interest in a vessel, or a line of vessels, from one person to another often made a great change in the service to our coastwise ports at this period.

In 1856 Harris & Morgan sold to the Southern Steamship Co. of New Orleans the "Charles Morgan," the "Louisiana,"

the "Mexico" and the "Perseverance, vessels that had been running to Texan and Mexican ports, for \$340,000. This was the beginning of Charles Morgan's incorporated marine interests in the Gulf of Mexico.

There were many changes made in the running of the different vessels at this time, brought about by change of interests in the lines to the Isthmus of Panama and to Nicaragua. But during all the changing scenes Marshall O. Roberts ran the United States Mail line to Chagres via New Orleans until about 1859. At the same time Livingston, Crocheron & Co. were running the "Black Warrior" and the "Cahawba" until February 20th, 1859, when the former went ashore during a snow squall at Rockaway inlet on the Long Island coast. They chartered other vessels to take her place until May 20th, 1860, when the "De Soto" was completed, followed in the next September by the "Bienville," two fine side-wheel and beam-engine steamships, built by Lawrence and Foulks, of Brooklyn, N. Y., and their machinery by the Morgan Iron Works, of New York City. During this year the United States Mail line had the "Moses Taylor," the "Philadelphia" and the "Empire City" running to the Isthmus, and at a not very distant date went out of business on account of the strong opposition of the Pacific Mail Co. Then, up to the time of active military and naval operations in the Southern States, Livingston, Crocheron & Co. had control of the New York and New Orleans trade. Most of the last trips from New York to Southern ports, previous to the interruption of commercial relations between the Northern and Southern States, were made from the 6th to the 10th of April, but the "De Soto" sailed from New York for New Orleans as late as April 23d, and as she was purchased by the United States Navy Department August 21st, 1861, for blockading services the vessel escaped capture in Southern waters.

The United States Mail line was unfortunate with their steamers, but probably not more so than those on the Pacific coast. The former lost the "Crescent City" on a reef in the Gulf of Mexico in 1856, the "Cherokee" was burned at her wharf in New York August 26th, 1853, and on September 12th, 1857, the "Central America" x "George Law" foundered at sea in a severe gale while on a passage from Havana and the

Isthmus to New York, and from the best information it was supposed about 423 persons lost their lives.

The port of New Orleans was not opened again to the peaceful pursuits of commerce until after Admiral Farragut had reduced the forts on the lower Mississippi river and taken possession of the city on April 25th, 1862. The first steamship from New York was the "Marion" on May 31st, one of Spofford and Tileston's old Charleston vessels, now run by them, and for a short time the "Trade Wind," a small propeller of 500 tons. A few weeks later Ludlum & Heineken placed the "Roanoke" in the New Orleans trade via Havana, and in the fall added the "Creole." In July Marshall O. Roberts placed the "Philadelphia" again in the New Orleans trade, but for a short time only, as in the fall the Nicaragua route was receiving his attention.

The Cromwell line began operations to this port in October with one of the old Parker Vein steamers, the "Potomac," and a few weeks later another of the same type, the "Parkersburg," was added. This service continued until the "George Cromwell" was finished and ready for service in Jan'y, 1863, being followed by her consort, the "George Washington," in April following. The Parker Vein steamships, built in 1853 and 1854, were the "Parker Vein," "Westernport," "Mount Savage," "Georges Creek," "Thomas Swann," "Potomac," "Totten," "Locust Point," "Piedmont," "Caledonia," "Patapsco," "Jackson" and "Parkersburg." In 1863 Spofford & Tileston had taken the "Columbia" from the New York and Havana route and with the "Marion" continued in the New Orleans trade. The latter was lost on Double Head Shot Keys April 2d, 1863. Ludlum and Heineken had at this time the "Roanoke," the "Yazoo" and the "Creole." The "Ella Warley" x "Isabel," ex-blockade runner, was also running to New Orleans during a portion of the year. She had been captured off the coast of Texas, trying to run the blockade with a cargo of arms, etc., April 25th, 1862, by the "Santiago de Cuba," and sent to New York; was condemned and sold to Providence, R. I., parties. This vessel was sunk by collision with the "North Star" February 9th, 1863, off the coast of New Jersey, just below Sandy Hook, while on a voyage to New Orleans.

The Star line began operations in April, 1863, the first vessel in service being the "Morning Star," followed in June by the "Evening Star." During the following year the lines increased the number of their vessels, the Star line chartered the "Suwo-Nada," a fine beam-engine steamship, for a time, until the "Guiding Star" was finished, and the Cromwell line with some of the old Parker Vein fleet, while Ludlum & Heineken had the two propellers "Emily B. Souder" and the "Yazoo," and for a short time the "North America." D. B. Allen had the two Vanderbilt steamships running for a portion of the year, the "Champion" and the "Ariel." During 1865 the Star line and the Cromwell line had control of the New York and New Orleans coastwise trade, the former having added the "Mariposa" and the "Monterey," two propellers of about 1,200 tons each; and the latter the "Star of the Union" and the "Fung Shuey," under charter, in addition to their regular steamships. During 1866 the Star line added the largest vessel of their fleet, the "Rising Star," but this vessel had seen little, if any, service to New Orleans. The Black Star line also entered the trade with the three former Cromwell-line propellers, the "R. R. Cuyler," the "Huntsville" and the "Montgomery." The "R. R. Cuyler" was sold in 1867 to the Republic of Columbia in South America and fitted as an armed vessel.

The Star line met with a very serious loss this year, in the loss of the "Evening Star," on October 3d, 1866, in a cyclone when off Tybee Island*. The immediate cause of the loss of this vessel was the shipping of such an immense quantity of water during the hurricane through the breaches made in her upper works on the starboard side. The vessel was in a seaworthy condition so far as the state of the hull was concerned, for during the month of July preceding the loss of the steamship the vessel had been taken on the dry dock for repairs, after having been ashore in the Gulf of Mexico, and a general overhauling was given the vessel. The fleet of this line, with the exception of the "Rising Star," were about 2,500

* Mr. E. S. Allen, who was for many years the New York agent for the Cromwell line of steamships, was the purser on the "Evening Star" at the time, and was in charge of the boat's crew that brought the first news ashore of the loss of the vessel.

tons each, 270 feet long, 40 feet beam and 25 feet deep, built by Roosevelt and Joyce at New York, with beam engines of large power. The engine in the "Morning Star" came from the Lake Erie steamer "Crescent City," the "Evening Star" from the "Queen of the West," and the "Guiding Star" from the "Mississippi." They were 80 inches cylinder by 12 feet stroke, except the "Guiding Star" that was 81 inches diameter of cylinder. The "Rising Star" was about 30 feet longer, with a new engine built by the Etna Iron Works, of New York, of 100 inches cylinder by 12 feet stroke. These vessels were the most lavishly fitted up for passenger accommodations of any of the coastwise lines at that date, and carried a larger number of passengers than any other line then running to New Orleans. The corporate name of the line was the New York Mail Steamship Co. Interested with James A. Raynor, the controlling director of the company, was Wm. R. Garrison. The former disposed of his interest in the company about six months before the loss of the "Evening Star." There had been added to the line some time previous the two iron-hull propellers "Merrimac" and "Mississippi,"* built by Harrison Loring, of Boston, Mass., in 1859. They were subsequently in the Brazil line.

During 1867, in addition to the Cromwell line and the Black Star line, in the early part of the year Wm. R. Garrison had some of the Star line vessels, and during the summer the "Mississippi," the "Monterey" and the "Mariposa" until some time in the fall of that year, when the New York Mail Steamship Co. took their vessels out of the New Orleans trade, and that closed out the ever memorable Star line.

The "Guiding Star" and the "Morning Star" made a few trips in the North American Lloyd's line to Bremen in 1867, and in 1869 and 1870 were chartered for a time with the "Rising Star" by Ruger Bros. in a line to Copenhagen. The "Morning Star" was shortly after broken up and her engine at a later date fitted up in the New Haven steamboat "C. H.

* In the Annual Report of the Commissioner of Navigation for 1899, page 218, it is noted that these vessels were of composite build. This is an error, from the fact that, after they had been in service for a time, there was another deck added to their height, and this, with the top sides, was constructed of wood. Their original construction was all of iron.

Northam." The "Rising Star" was sold to the Pacific Mail Steamship Co. in 1867.

During 1868 the Cromwell line appears to have been the only one of the old lines left in the New Orleans trade. Livingston, Fox & Co. this year had purchased the "Bienville" and the "De Soto" after their naval service and had them again in the New Orleans business. A new line also entered the trade this year under the name of the Merchants' line. This enterprise was backed by Wm. F. Weld & Co., of Boston, Mass. The line run with considerable success until the business depression of 1874, when the interests were closed out. They had a fleet of five propellers, the "General Grant," the "Crescent City" x "Massachusetts," the "Sherman," x blockade runner "Princess Royal," the "General Meade," x blockade runner "Bermuda," and the "United States." They were vessels of about 1,200 tons each. Captain Geo. L. Norton, of the "Marine Journal" of New York City, was in command of one or more of these vessels.

In the next few years the changes were not many, with the exceptions that the Cromwell line added the "New Orleans," their first iron-hull vessel, to the line in 1871, followed by the "Knickerbocker" in 1873 and the "Hudson" in 1874, all built by Pusey & Jones Co., of Wilmington, Del. The "George Cromwell" and the "George Washington" had been placed on the New York and Portland route. Livingston, Fox & Co. went out of this business about 1872.

The "New Orleans," the "Knickerbocker" and the "Hudson" were fitted with engines from designs of John Baird, constructing engineer of the line, and one of original ideas in his profession. At the time of the construction of these vessels their engines were the subject of much discussion, more especially the "Hudson," among marine engineers, as to their economy when compared with the compound engine. The "Hudson's" engine was designed for a working steam pressure of 90 lbs. per square inch and cutting off at 6 inches of the stroke. This was thought to be a very high steam pressure to be used in a simple condensing engine, especially of that size, and there were many doubts entertained by engineers who were held in high esteem by the profession as to these engines being as economical as the compound engine that was

just coming into use. But time proved them economical and profitable vessels for their owners. The compound engine was the fashion, it might be so called, of the day in marine matters, and to follow along those lines was the proper thing to do as in many other lines of commercial and professional life. The owners of new steam vessels generally desired the compound engine for their vessels, and the builders were ready to construct them. The compound engine had its day, followed by the triple-expansion type, and the initial enthusiasm having subsided to a great extent, has been followed by the first stages of the quadruple expansion. Is the next electricity, or turbine, or what?

The Cromwell line added another iron-hull steamship to their otherwise fine fleet of vessels in the "Louisiana" in 1880. The hull of this vessel was built by John Roach & Son, but was fitted with a pair of compound beam engines, built by the Delamater Iron Works from designs of John Baird, that were certainly a novelty in design. These engines were in use in the vessel until about 1898, when they were removed and the inverted triple-expansion type substituted. For several years there was not a steamship on our coast that found it possible to keep company with the "Louisiana" when on her mettle, and the vessel held the record to New Orleans for many years. After her second or third voyage several tons of the heavy iron enclosures above the main deck, and other iron work, were removed that increased the vessel's stability. The naval steamer "Chicago" had the same type of engines when originally constructed in 1885, but these were removed when the vessel was rebuilt in 1898. The company has added to the line in the last few years two fine screw steamships, the "Comus" and the "Proteus," similar in almost every particular to the latest of the Morgan line steamships. The line ceased to exist after August 1st, 1902, as a corporation, their floating property having been purchased by the Morgan line, though the latter has had a controlling interest of the line for a few years. H. B. Cromwell & Co. run the Parker Vein line of propellers in 1853 to Baltimore, later the Savannah line and, in 1856, the New York and Portland line with the "Totten" and the "Caledonia."

In 1875 Harlan & Hollingsworth Company built for Charles Morgan the "Brashear" and the "New York," the pioneers of the Morgan line to New York. These vessels were a short time after altered by raising their top sides and adding another deck, and the former called the "Lone Star." The next year they constructed the "Algiers" and the "Morgan City" that were very similar to the first two of the fleet. In 1878 the Morgan Louisiana and Texas R. R. & S. S. Co. was incorporated to cover all the railroad and steamship interests in the southwest that was controlled by Charles Morgan.

Their first steamship with compound engines was the "Chalmette," built by Wm. Cramp & Sons Co. in 1879. The "Excelsior" followed in 1882 by the Harlan & Hollingsworth Co. Since then they have added several fine vessels to their fleet, mostly with triple-expansion engines, that cannot be excelled for their form, nor their speed, for a similar service.

This corporation is now part of a syndicate, consisting of the South Pacific R. R. Co., with the Galveston and San Antonio R. R. Co., the Houston & Texas R. R. Co., Louisiana & Western R. R. Co., and some other railroads that form a system for through freight from New York to the Pacific coast, under one corporate management, and who largely control all the coastwise freight between New York and the Southwest to the Pacific Ocean.

The Morgan line gave up running to Brashear or Morgan City in August, 1891, as it was found too expensive to keep the channel open for their large steamships.

They next gave up running to New Orleans, La., of the Morgan line steamships in part in August, 1902, the first vessel on the New York and Galveston route being the "El Norte," leaving New York August 2d. The late Cromwell line steamships "Comus" and "Proteus" remain in the New Orleans service.

NORFOLK, VA.

† After the steam-brig "New York," in 1822, there does not appear to have been any steam vessel in operation between New York and Norfolk until the "David Brown," that had run from New York to Charleston, S. C., was placed on the

Norfolk route in April, 1835, and continued the service for about three months. It was intended at this time, if the vessel should be successful in opening a trade by steam vessel between the ports, to extend the service from Norfolk to Charleston; and in fact the "Dolphin" was run for a few trips between the latter ports, which was not encouraging to the owners. The distance between the terminals was not great enough for the steam vessels at those early days to always shorten the time of the sailing packets. X

In August, 1844, Peck, Clyde & Co. had a propeller of 160 feet long, built in Philadelphia, with a Loper wheel, and run from New York to Baltimore and Norfolk. This was the commencement of the Clyde line, they having been, prior to this date, in the Ericson Steamboat line of propellers between Philadelphia and Baltimore.

The first of the regular steamship lines to run from New York to Norfolk and Richmond, Va., was that operated by the New York and Virginia S. S. Co., who had built for them in New York the "Roanoke" and the "Jamestown," both double-beam engine steamships of 1100 tons each, the "Roanoke" in 1851, and the "Jamestown" in 1853. In the year 1853 there was a line of propellers running between the same cities, the "City of Norfolk," the "City of Richmond," and a few years later, the "Virginia"; they were of about 500 or 600 tons each. In 1858, William H. Webb built for the New York and Virginia S. S. Co. their third steamship, the "Yorktown," a much larger vessel and with more power, that completed their fleet prior to the opening of the Civil War. All of these vessels were destroyed during the war. The "Jamestown" and the "Yorktown" were taken possession of by the Confederate States Government at the outbreak of hostilities and fitted with 10 guns each as gunboats, but their field of operations was limited to the James River. The "Jamestown" was sunk, with two river steamboats, the "Curtis Peck" and the "Northampton," at the obstructions placed previously in the river by the Confederate authorities, a few miles from Fort Darling, in August, 1862. But previous to this, both these steamers had been plated with iron for protection to their machinery, and were in the engagement of the first day with the "Merri-mac" or "Virginia," when they destroyed part of the Union

fleet at Newport News, as well as the second day, as tenders to the "Merrimac," when the latter vessel and the "Monitor" had their memorable naval engagement. The "Yorktown" was then known as the "Patrick Henry." The "Roanoke" was the only one of the line saved from service in the Confederate cause, but the vessel was disposed of in the same interest in a summary manner on September 29th, 1864, while in the New York and Havana trade. A Confederate naval officer and several men had taken passage from Havana on the vessel, and when six or eight hours from port, took possession of the vessel by force, run her into Bermuda, subsequently went to sea, captured a sailing vessel, to which were transferred all the passengers and crew of the vessel, and set the latter on fire. The "Yorktown" was blown up during the evacuation of Richmond by the Confederate naval officers where she lay a few miles below the city. That wiped out the first fleet of the N. Y. and Virginia S. S. Co.

As the James River was the most prominent scene of military operations during the war, there was no commercial intercourse to Norfolk or Richmond until after the surrender of General Lee, on April 9th, 1865. In May, 1865, the "Yazoo" and the "Creole," each of about 1,200 tons, built during 1863, for the New York and Virginia S. S. Co., were running to Norfolk, Va., under the old New York agents, Heineken & Pleasant, until the "Niagara" and the "Saratoga" were completed in the following month of December.

The Atlantic Coast Mail S. S. Co. also had several of their steamships running to the James River this year, most of the time the "Hatteras," the "Albemarle," the "Varuna" and the "Ariadne," under the management of Livingston Fox & Co., who was associated with N. L. McCreedy, Isaac Bell, Francis Skiddy and others in the company. Matters run on until 1866, when there was a division of the floating property of the company. The "Hatteras," the "Albemarle," the "Rapidan," and the "Raleigh" were four small side-wheel vessels of 860 tons each, with beam engines, built at Brooklyn in 1865; they were not nautical beauties, their full, deep stern being a marked feature with them all. These vessels were a part of the fleet of the Atlantic Coast Mail S. S. Co., and in the division of the property Livingston Fox & Co. took the

two R's, the "Rapidan" and the "Raleigh," while the "Hatteras" and the "Albemarle" were taken by N. L. McCready.

The "Niagara" and the "Saratoga" were side wheelers of the same length as the former "Roanoke," but with more beam, and with the exception of having a single beam engine. While they were nice-looking vessels, they were unprofitable vessels to their owners, as their freight capacity was very limited for their size.

With the "Albemarle" and the "Hatteras" as a basis, N. L. McCready formed a consolidation, in June, 1867, with the New York and Virginia S. S. Co., who owned the "Niagara" and the "Saratoga," and the "Yazoo" and the "Creole," under the corporate name of the Old Dominion S. S. Co., with N. L. McCready as President. The "Creole" was lost in March, 1868, and the "Niagara" and the "Saratoga" were sold in a few years to parties in Cuba. Norfolk was not thought at this time to be the best point on the coast for a profitable line, but the increased railroad facilities of that section has brought much business to the steamship company, both in freight and passengers.

The Old Dominion Co. built a few side-wheel steamships after the formation of the company: the "Isaac Bell," in 1868, wooden hull, built at Brooklyn, the last of their wooden-hull vessels; the "Wyanoke," iron hull, built in 1870, and the "Old Dominion," iron hull, constructed in 1872, the two latter by Harlan & Hollingsworth Co.

In 1872, the Virginia Steamship and Packet Co. was incorporated as an opposition line, and the iron hull of a vessel for them was constructed at Richmond, Va., by Richard Lavery, who was at one time superintendent for Harrison Loring, the shipbuilder, at South Boston, Mass., but when the hull was completed it was sold to the Old Dominion S. S. Co., who sent the hull to Harlan & Hollingsworth Co., who fitted the machinery on board. There was also a fair prospect of another opposition in 1874, when the "Geo. W. Elder" was built; this vessel also passed into other hands, and was sent to the Pacific coast.

The Old Dominion Company subsequently had constructed by the Delaware River Iron S. B. & E. Co. the "Manhattan," in 1879, of 1,525 tons; the "Breakwater," in 1880, of 1,044 tons;

the same year they lost the "Isaac Bell" by fire. In 1882, the "Roanoke" and the "Guyandotte," each of 2,354 tons, were built; in 1884, the "Seneca," of 2,729 tons; in 1894, the "James-town" and the "Yorktown," each of 2,898 tons, and in 1897 the "Princess Anne," of 3,078 tons; in 1899, the "Hamilton" and the "Jefferson," each of 3,127 tons.

The "Yorktown," of 1894, was sold to the Navy Department, in 1898, for \$475,000, for service in the Spanish-American war, and her name changed to "Resolute."

The present fleet of this line consists of the "Hamilton," the "Jefferson," "Guyandotte," "Princess Anne" and "James-town." They form a daily line between New York and Norfolk.

GALVESTON, TEXAS.

Galveston was a port prior to 1860 that had most of its commercial intercourse with the outside world through the city of New Orleans. Charles Morgan had a line of coastwise steamers from New Orleans to the coast towns of Texas, and extending to Mexican ports, before 1840. The first of this line was in all probability run by the "Columbia," from New Orleans to Galveston, in February or March, 1838, and followed later by the "New York," both from the New York and Charleston line. The business of Galveston before the date named was very small, the port itself having not more than a thousand inhabitants.

What retarded the development of the seaport was the absence of a safe inlet to the harbor and sufficient depth of water, with a large enough area of anchorage for vessels at all seasons of the year. An engineer thus reported the conditions surrounding the harbor and its entrance: "In 1869 it was often impossible for the Morgan line steamers to cross the bar at Galveston. Passengers, freight and baggage, were frequently lightered ashore at great risk of being thrown overboard. The outer bar of the harbor being three miles from Fort Point, and had a channel depth of 12 feet, but vessels were compelled to "lay to" awaiting a favorable wind and tide before attempting to cross the bar." Then there was the inner bar, and but a limited area of the harbor proper that could float

a vessel drawing over 12 feet. It was not until 1870 that any improvements were made in these conditions, when a jetty was completed through an appropriation made by the city of Galveston that resulted in an increased depth of water of two feet. In 1870, Congress having made an appropriation for the purpose, the U. S. engineers assumed charge of the work of the improvement, and by the ordinary method of dredging increased the depth of water still further.

The original project for the permanent improvement of this harbor was made in June, 1874, and contemplated the construction of jetties, which were expected to deepen the channel to 18 feet, but this proved unsatisfactory. The improvement of the harbor has been carried on under a project formulated by a board of engineers of the U. S. Army, made in 1886, and has given a gradual increased depth of water ever since, until at the survey made in February, 1901, there was a depth of 25 feet 5 inches on both inner and outer bars. There has been over \$8,000,000 expended by the U. S. Government to make the improvement in the harbor, but what a benefit it has been to the commerce of the port, and at the same time to the southwest, can be seen in one direction, and that is in the increased size and carrying capacity of the steamers of the New York and Galveston line of twenty-five years ago and those of the present day.

The first coasting steamships to trade to Galveston outside of New Orleans, after the close of the Civil War, was for a short time a line from New York by Williams & Guion, but the first permanent service was that of Spofford & Tileston, of a line from New York of small propellers ranging from 150 feet to 180 feet in length, and drawing from 10 feet to 12 feet of water loaded, in 1866 and 1867, and named the "Tybee," "Perit" and "Trade Wind."

In 1871, C. H. Mallory & Co. opened a line from New York with larger vessels than any previously to that port, among them being the "Ariadne," "City of Galveston," and "City of Dallas," and later "City of Houston." At the same time William P. Clyde & Co. had the "Clyde," "Wilmington," and later "Geo. W. Clyde" in this service, they being run for their account by Mallory & Co. At a later date Mallory & Co. added the "City of Austin" and the "City of San Antonio." The

vessels of Clyde & Co. were run to Galveston until 1876, when the company having become interested in the Pacific Mail S. S. Co., and also in the Havana line, after the collapse of the Atlantic Mail Company bubble, left the Galveston business to Mallory & Co., and, as they had quite a fleet of steam vessels, were well able to hold the business they had at this time. It should be noted that the Morgan S. S. Co., from New York to New Orleans and the Texas R. R. Co., were beginning to make their connections felt as being a factor of some moment in the transportation business to the Southwest that was not to be ignored. The first iron steamship of the Mallory line was the "City of Houston," built in 1871, by Reaney Son & Archbold, at Chester, Pa., and lost at sea in 1878. Their wooden-hull vessels were the "City of Dallas," built in 1872, and the "City of Galveston," in 1870. Since 1880 the company have had constructed nine vessels for the Gulf of Mexico, for these Galveston steamships stop at Key West, Fla., the "Guadeloupe," the "San Marcos," the "Lampasas," the "Alamo," the "Comal," the "Nueces," the "Concho," the "Leona," now the "Sabine," and the last, the "Denver," the largest and finest of the fleet, that has been running since late in 1901.

The claim that is made that the steamship "George W. Clyde" was the pioneer merchant screw-propeller steamer in this country with the compound engine, is an error for more reasons than one. First, because there were several compound marine engines in merchant vessels on the Northern lakes prior to 1870; and second, that there were six steam vessels on the Atlantic coast, four merchant steamers and two United States government vessels, with compound engines prior to the "George W. Clyde." Three of these had been altered from simple engines, and three were new vessels with engines complete, some "steeple" and some fore and aft compound. The tugboat "W. F. Hamill" was changed in February, 1870; the propeller "Norwich" had small cylinder added in March, 1870; the "Benefactor," of the New York and Philadelphia line, was built and finished in August, 1870; the propeller "Fern," for the Lighthouse Department, was completed in December, 1871, fore and aft compound; the "Hassler," for the Coast Survey Department, was finished in November, 1871; and the "Stars and Stripes," subsequently the "Metropolis,"

was altered to a compound by adding small cylinders in September, 1871. The "George W. Clyde" was not completed until April, 1872, leaving New York on April 6th for Galveston, Texas, but during the previous month, while her joiner work was yet in an unfinished state, she was given an experimental trip from Philadelphia to Charleston, S. C., with a cargo of freight, but no passengers. When it is said the "George W. Clyde" was the first steamship with a fore and aft compound engine *having a receiver between the two cylinders*, then the claim can be allowed.*

NEW YORK TO HAVANA, CUBA.

The steam communication between New York and Cuba, setting aside the service of the "Robert Fulton," from 1820, is almost identical, in its early stages, with the development of our coastwise steamship lines, as it was through these lines that commercial intercourse was held with Havana.**

The first steamship running for any time direct from New York to Havana was the "Quaker City," in May, 1859. The vessel run also in 1860 and 1861, until purchased by the Navy Department for blockading service. In 1862, Spofford & Tileston started a line and placed the "Columbia," which they had on the Charleston route previous to 1861, with a new vessel they had constructed during the year, and named the "Eagle." This was the second "Eagle" that they had built; the first was subsequently the "Rhode Island" and the "Charleston." Ludlum & Heineken were at the same time running the "Roanoke." In 1863 the "Eagle" was the more regular of all the vessels in the Havana trade, the "Roanoke" stopping there at times on the voyage to New Orleans. It was during the next year that the "Roanoke," on September 29th, while on the voyage from Havana, was taken possession of by an officer of the Confederate States Navy, with some men, all of whom

* See "Engineering News" of New York, of October 5th, 1899, in an article by the author on "Early Compound Marine Propeller Engines in United States."

** In 1841 there was a ship named the "Clarion," having Ericsson twin-screws, operated by two engines and without the intervention of gearing, as auxiliary power, that run to Havana from New York two or three voyages, making the run each time in 7 or 8 days.

sailed as passengers, who subsequently set the vessel on fire after putting the passengers and crew on a sailing vessel. Hargous Bros. run the "Havana" and the "Liberty," two large propellers, the first an iron-hull vessel, built that year at Philadelphia, Pa., and the "Liberty," a wooden-hull vessel, while Spofford & Tileston had the "Eagle," the "Columbia," and the "Morro Castle," which latter was a new vessel, this year; the engine of this vessel was originally in the "City of Buffalo," on Lake Erie, and afterwards put in the "Grand Republic," in New York waters. In 1865 and 1866 Hargous Bros. were still in the same trade, and Spofford & Tileston were running same vessels as in 1864. In May, 1866, the Atlantic Mail S. S. Co. came into possession of Spofford & Tileston's vessels, and in 1868 and 1869 Livingston Fox & Co. were running the "Rapidan" and "Raleigh." This Atlantic Mail S. S. Co. was formed in 1865, the principal owners being Wall Street capitalists. They purchased the fleet then owned by Com. Vanderbilt, and running to Aspinwall, which they continued for a time. They also run a line from Panama to South Pacific coast under a subsidy. This large fleet was subsequently disposed of. They run the line to Havana for about seven years, when the company failed from competition and other causes, and the three or four vessels they then owned were sold to satisfy claims. They received in the time they run to Havana from the government for carrying the mails the sum of \$234,957.

Alexander & Sons began to run steamships to Havana, on the voyage to Mexico, with the "City of Mexico," and the "Cleopatra," in 1869, and in 1870, with the addition of the "City of Merida." In 1874 they had the "City of Merida," "City of New York," and the "City of Havana," all wooden-hull propellers. The Clyde line had running there at this time the "Crescent City," the "Wilmington," and the "Morro Castle," which they continued for a few years, and in 1880 the "Santiago de Cuba," that had been altered to a propeller, with the "Morro Castle." Alexander & Sons, in 1877, had built for them by John Roach & Sons, their first iron-hull vessel, the "City of Washington," and in 1879 the "City of Alexandria," that was slightly larger.

In the same year, 1877, James E. Ward & Co., who had been in the West Indian trade with sailing vessels, had built for them by John Roach & Sons the "Niagara" and the "Saratoga," each 272'x38'x24', with compound engines. Mr. Roach became interested in the line through the construction of these vessels, and more than one of our coastwise lines were built up at this time through his liberality and the aid of some New York capitalists. He was also engaged at this time with other builders in furthering the interests of iron shipbuilding in this country, through legislation in Congress, that had felt the business depression since the panic of 1874. The starting of new lines, and the development of old ones at this period may be noted, though not from the former cause. The "Saratoga" was purchased by the Russian government for a war vessel, when near completion, and in 1879 another "Saratoga" had been completed for the company. In 1880 the same builders constructed the "Newport," that was 50 feet longer than either of the other vessels, and with a larger proportion of engine power. This vessel made very fast time on the passage to Havana or to New York, and was considered to be one of the vessels of high speed on the coast at the time.

At this date there were but two lines to Havana, and the rivalry was brisk. The next year the William Cramp & Sons S. B. Co., of Philadelphia, Pa., built for the Alexander line the "City of Puebla," of about the same dimensions and power as the "Newport." This vessel was fitted with fine passenger accommodations, and made excellent time between the two ports. About this time the contract for carrying the Mexican mail expired, and the company failed to renew it with the Mexican government, but having large freight contracts to fulfil that run for some time, they chartered later two foreign steamships for a year or so, and in 1884 sold the "City of Puebla" to the Pacific Mail S. S. Co., and in 1888 sold the "City of Washington" and the "City of Alexandria" to the New York and Cuba Mail S. S. Co., thus closing up the business of the Alexandria line.

Since the Spanish-American war of 1898, the New York and Cuba Mail S. S. Company have added to their fleet to Cuban ports three twin-screw steamships of increased dimensions over their former vessels, with very large power of

engines, and since they have been in operation have proved themselves to be the fastest as well as the most popular vessels that have been on the line. The business had increased in a few years so largely that it was found necessary to have larger and faster vessels to keep abreast of the times.

NEW YORK TO SAN FRANCISCO.

It is the popular impression that the discovery of gold in California, in 1848, was the inciting cause of the establishment of steam navigation on the Atlantic Ocean and the Pacific Ocean, via the Isthmus of Panama. But such was not the case. The causes existed prior to that date. The treaty of the United States with Great Britain, in 1846, that settled the line of the northwest boundary covering the present State of Oregon; and during the early part of 1848, Mexico having ceded California to the United States, opened up a rich and fertile land that was taken advantage of by many settlers from the Eastern States, whose only channel at that time for reaching the distant country was across the western plains and the Rocky Mountains by wagons, for the railroad across the plains was not commenced for some fifteen years after. It was with a view of facilitating the means of communication between the Atlantic States and the Pacific possessions that the Congress authorized a mail steamship service via the Isthmus of Panama.

A contract for a monthly mail service on the Pacific Ocean was made with Arnold Harris, who was engaged in the Gulf of Mexico steamship trade, with Charles Morgan, at \$199,000 per annum, who assigned the contract to W. H. Aspinwall and associates on November 30th, 1847. This mail contract was considered of about as much value at the time as the one for the Atlantic coast, and there is no doubt but that the gold discovery in California saved all those who had become interested in its fulfilment from financial ruin.

The Pacific Mail S. S. Co. was chartered by the Legislature of the State of New York on April 13th, 1848, for twenty years, with a capital of \$400,000, that was subsequently increased to \$2,000,000. Their first steamship, the "California," sailed from New York on Friday, October 6th, 1848, and

arrived at Panama on January 20th, 1849, and sailed for San Francisco on January 30th. The second steamer, the "Oregon," sailed on December 9th, 1848, and arrived at Panama on February 26th, 1849. The third vessel, the "Panama," left on February 15th, 1849, but became disabled when several days out from New York, and had to return for repairs to her engine, and subsequently sailed for the Pacific Ocean. These vessels were built, the "California" and the "Panama," by Wm. H. Webb, and the "Oregon" by Smith & Dimon. They were loaded when leaving New York with material for buildings, tools for the shops, duplicate pieces of machinery and supplies of all kinds that were necessary to install a plant for the repairs of the vessels and the machinery, all of which had to be sent from the Atlantic coast.

The running of a line of steam vessels on the Pacific coast at this period was very expensive in the matter of coal alone, as the supply had to be brought from the United States or England, and cost not less than twenty dollars a ton, and in one case fifty dollars a ton was paid. The company had as many as nine vessels in operation, consuming as much as 35,000 tons of coal a year. As there was no dry dock at San Francisco until one was completed by the United States government in 1854, the company was compelled to beach their vessels when necessary for cleaning their bottoms, or for repairs below the water line.

What probably had more to do with developing this gold craze to such proportions as it assumed, was that part of the President's Annual Message of 1848 on the discovery of gold in California, coming as it did just at the time of the year when many were unemployed, and after the first full account of the mineral wealth of the new country had been laid before the people in the daily journals.

The part of the message relating to the discovery of gold was as follows, viz.:

"It was known that mines of the precious metals existed to a considerable extent in California at the time of its acquisition. Recent discoveries render it probable that these mines are more extensive and valuable than was anticipated. The accounts of the abundance of gold in that territory are of such an extraordinary character as would scarcely command

belief were they not corroborated by the authentic reports of officers in the public service, who have visited the mineral districts and derived the facts which they detail from personal observation. Reluctant to credit the reports in general circulation as to the quantity of gold, the officer commanding our forces in California visited the mineral district in July last for the purpose of obtaining accurate information on the subject. (His report to the War Department of the result of his examination and the facts obtained on the spot is herewith laid before Congress.) When he visited the country there were about 4,000 persons engaged in collecting gold. The explorations already made warrant the belief that the supply is very large, and that gold is found at various places in an extensive district of country. Labor commands a most exorbitant price, and all other pursuits but that of searching for the precious metals are abandoned. Ships arriving at the coast are deserted by their crews and their voyages suspended for want of sailors. Our commanding officer there entertains apprehensions that soldiers cannot be kept in the public service without a large increase of pay. Desertions in his command have become frequent. This abundance of gold and the all engrossing pursuit of it have already caused in California an unprecedented rise in the prices of the necessities of life."

Looking back to the period named, it does not seem improbable but that the endorsement in the President's Message was for the purpose of creating new states on the Pacific Ocean by emigration from the older States, to be controlled politically by the dominant party at that time. The awarding of the mail contracts were political in their character, as known at the time.

Right after this glowing account of the wealth of gold in our new possessions, and coming from such a high authority as the President's Message, preparations were made by the eastern merchants on an extensive scale for the forwarding of the necessary merchandise to the new possessions. Vessels sailed almost daily from the principal ports on the Atlantic coast for San Francisco. During the month of February, 1849, there were 22 sailing vessels cleared at the port of New York for California with about 2,000 passengers. Boston, during the same period, 10 vessels and 700 passengers. Other

Atlantic coast ports in proportion. These sailing vessels went by way of Cape Horn.

The means of transit across the Isthmus of Panama before the railroad was in operation, was by canoes at first, which were propelled by the natives some thirty miles up the Chagres River, the remaining distance to the Pacific Ocean being traversed on land by mules. The distance from ocean to ocean was usually covered in two days. A small side-wheel steamboat named "Orus," that had run in New York Bay, and an iron-hull side-wheel steamboat named "Gorgona," that was built in New York City, was run on the Chagres River in connection with the railroad before its completion. Passenger fare through, first class, \$600; deck, \$300; sailing vessel, \$300.

By the summer of 1849 the first mad rush had expended itself; more steamships were running to Chagres, and the means of transportation on the isthmus had materially improved. By this time but four sailing vessels were leaving for the "gold diggings" from the Atlantic coast.

A contract was made with those interested in the Pacific Mail S. S. Co. with the government of New Granada for the exclusive privilege of constructing a railroad across the isthmus. Work was commenced in May, 1850, and after many discouragements and difficulties, mainly from the labor employed in building the road being unacclimated, it was finished on January 27th, 1855. Its entire length is 47 miles.

In 1851, the company built the "Golden Gate," and in 1853 the "John L. Stephens," both of them much larger and of more power than their first three vessels. They purchased six or eight steamships at different times for their service on the Pacific Ocean, mostly vessels of under 1,000 tons. There were many vessels sent around from the Atlantic coast when the gold fever broke out, some of them worn out in the service on the coast, and others purchased by the Pacific Mail Co. The company had built for them at New York, in 1853, by Wm. H. Webb, the "San Francisco," and when but two or three days out from New York on her voyage to the Pacific coast, having a number of United States troops on board for duty in California, she encountered a heavy storm and was lost through the derangement of her machinery. This occurred

on December 24th, 1853. This was the first ocean steamship having feathering buckets to her water wheels.

The business of the company prospered in spite of all opposition, as there were several vessels sent to the Pacific coast by outside parties that were ill adapted for the work. A company that was projected in New York in 1853, having some shipbuilders in the organization, that was intended to run a line on the Pacific coast, said of the Pacific Mail Co. in its prospectus, viz.: "It is hardly necessary to refer to what is so generally known, the unexampled productiveness of the United States Mail S. S. Co. and the Pacific Mail S. S. Co., running by way of Aspinwall and Panama. The stockholders, as is well known, have not only received ample dividends on their original investments, but the investment itself has been quadrupled in one of those companies by the issue of new shares representing the additional vessels which have been paid for out of the surplus earnings, while in the other quite equal results have been secured."

The mail contract expired in 1859, as did also the contract with the United States Mail Co., and a lively war was inaugurated between all interested in the California trade. In September, 1859, the "Baltic" and the "Atlantic" were put into service between New York and Aspinwall, where there was already abundance of excitement. These vessels were run by the North Atlantic S. S. Co. until March, 1860, and were employed on the route with the purpose to try and obtain a renewal of the mail contract by making better time between the two ports than Marshall O. Roberts' steamers had done. It did not require much effort to shorten the time by these vessels, but the company failed to obtain a renewal of the mail contract, as Congress was not making appropriations at that time for the benefit of any northern commercial enterprise.

In December, 1859, there was a very spirited race between the "North Star" and the "Atlantic" from New York to Aspinwall. The latter had the advantage from New York harbor all the way down the coast to the east end of the island of Cuba, where the "North Star" formed a closer acquaintance with her competitor, and from there to Aspinwall the vessels were not out of one another's sight. They were driven with all the power of their engines to the end of the contest, but the

"North Star" arrived at Aspinwall 15 minutes before the "Atlantic." Time from New York, 7 days 3 hours and 20 minutes. The shortest time made up to 1855 between San Francisco and New York was by the "Golden Gate," on the Pacific side, and the "George Law," on the Atlantic side, of 19 days and 2 hours of running time; 11 days and 4 hours on the Pacific side, and 7 days and 22 hours on the Atlantic side.

Prior to 1860, Cornelius Vanderbilt had obtained control of the Atlantic coast business, formerly held by the United States Mail Company, where he had in operation the "Ariel," the "Northern Light" and the "North Star," and continued to make connections to the Pacific coast until 1863. The "Ariel" was captured by the Confederate steamer "Alabama," while en route from New York and when off the east coast of Cuba, on December 7th, 1862, and released on giving bonds for \$261,000. The Atlantic Mail S. S. Co. obtained possession of this fleet about 1863. This company sold all their fleet of steamships running to the Isthmus to the Pacific Mail S. S. Co. in September, 1865, for \$2,000,000 in the stock of the latter company, the former corporation still remaining intact for future business, thus giving the Pacific Mail S. S. Co. control of the Pacific and Atlantic business to California for a few years. The latter company had on the Pacific Ocean at this time the "Constitution," the "Golden City," the "Colorado," the "Sacramento," the "Golden Age," the "St. Louis," the "Sonora," the "Uncle Sam," the "California," and the "Tobago." The first four were those large beam-engine side wheelers. On the Atlantic Ocean were the "Atlantic," the "Baltic," the "Henry Chauncey," the "Montana," the "Arizona," the "Mariposa," the "Monterey," the "Senator," the "Ocean Queen," the "New York," the "Costa Rica," the "Northern Light," the "North Star," the "Ariel," the "Champion" and the two 4,000-ton ships building for the China service. Seven of these were from the Atlantic Mail Company's fleet.

There had been many changes in the affairs of the company since 1860, and several of those who were interested in the company in the early days of the organization could not see their way clear in giving support to the administration of that day. One of the developments of this state of affairs came in the form of an opposition by William H. Webb, W. H.



PACIFIC MAIL S. S. "GOLDEN CITY."

Aspinwall, M. O. Roberts and others. The North American S. S. Co., or Nicaragua line, had been running to Nicaragua for many years, now opened another line via Panama in the fall of 1867, with the "Guiding Star," "Santiago de Cuba," the "Dakota," and the "Nebraska," which opposition was continued with low rates of passenger fare as well as freight charges until October, 1868, thus giving the old company as lively an opposition as they desired. There was manifested a most bitter opposition feeling in this move. The "Nevada," the "Nebraska" and the "Dakota" were sent to the Pacific coast in the fall of 1870, and in the spring of 1871 opened a line from San Francisco under the name of "United States, New Zealand and Australian Mail S. S. Co.," sailing once a month, via Honolulu, and run until the fall of 1872, when they were withdrawn. These vessels were beam-engine steamships, built by Henry Steers, at New York, and were about 280 feet long, two of the vessels having engines each 81-inch cylinder, and the "Nevada" 85 inches, all 12 feet stroke. W. H. Webb, the moving spirit of the enterprise, endeavored to get a subsidy for the line, but the revenue reformers held the purse strings of Uncle Samuel's treasury at this time, and it was impossible to get an appropriation through Congress for the purpose. As soon as this line commenced its service on the Pacific side a foreign tramp line was covering the same trade.

In 1861 the Pacific Mail S. S. Co. commenced the construction of the first of the large fleet of side-wheel vessels of about 4,000 tons. The China and Japan line was inaugurated by the "Colorado," leaving San Francisco January 1st, 1867, followed by some of the earlier side-wheel steamships.

In 1873 the company took a new departure in accordance with the spirit of advancement in shipbuilding, by having three new vessels constructed with hulls of iron, the "Colon," by John Roach & Son; the "Acapulco" and the "Granada," by Harlan & Hollingsworth Co., all having compound engines, constructed by the John Elder Co. of Glasgow, Scotland, and fitted on board the vessels by John Roach & Son, at New York. These vessels were each 300 feet long by 40 feet beam, having cylinders 50 inches and 86 inches diameter by 42 inches stroke. The same year John Roach & Son also constructed for them the "Colima," being 12 feet longer than either of the other

named vessels, with a compound engine of 51 inches and 88 inches by 42 inches stroke. The next year the same builders constructed the "City of Panama" and the "Guatemala," each about 50 feet shorter than the "Colima." The same year they also had in hand the "City of Tokio" and the "City of Peking" for their China line, they being each 423'x47'10x38½', and having a pair of compound engines, each having cylinders 51 inches and 88 inches by 54 inches stroke. The large side wheelers were now laid up, being such large coal consumers. When deeply loaded their water wheels were so immersed that their engines were "tied up," and their speed not over an average of about eight knots under good conditions. They subsequently added the "City of Para" and the "City of Rio Janeiro," formerly of the New York and Brazil line; also had several built for their Australian and the Pacific coast routes.

About 1873 the company fell under the control of Wall Street interests, that were also interested in the Union Pacific Railroad, that had been completed a few years previous. In 1875 the Panama Railroad Company instituted proceedings to sever the relations existing between the two companies, claiming that the business of the steamship company and of the Panama Railroad Company at the same time were sacrificed to the interests of the Union Pacific Railroad Co. After some time a traffic arrangement satisfactory to the two conflicting interests was agreed upon, and continued in force until 1893, and from then until December, 1895, there were two lines running on the Atlantic as well as on the Pacific side. Until a recent date the Panama Railroad Company has controlled the Atlantic coast trade, and the Pacific Mail Company confined itself exclusively to the Pacific coast.

The Oceanic S. S. Co. opened their line to Honolulu from San Francisco in 1884 with the steamships "Mariposa" and the "Alameda."

NICARAGUA TRANSIT CO.

Commodore Vanderbilt entered the California trade at a much later date than the Pacific Mail Company, under the name of the Nicaragua Transit Company. Having received concessions by the way of the San Juan River, in Nicaragua,

to the Pacific Ocean, he was not prepared to open the route until June, 1851, with the steamship "Prometheus," although he had begun operations in February previous by the way of Chagres temporarily. Two small side-wheel boats, about 100 feet long each, were built at New York for the river service. In 1852 he added the "Northern Light," and in 1853 the "Star of the West," both double beam-engine steamships. On the Pacific side he made connections with the steamships "S. S. Lewis," the "Pacific" and the "Sierra Nevada." In 1853 he sold out his interest in the company, and Charles Morgan, C. K. Garrison and others became largely interested. He had for some time previous to this under construction a steamship that he intended to use for a trip to Europe, named the "North Star." After his return he found the directors of the company not disposed to live up to the agreement for the disposal of his interest in the company, and in 1854 he opens an opposition line by the way of Aspinwall or Chagres, with the "North Star," in connection with Edward Mills' steamships on the Pacific side. This lasted less than a year, although it was carried on with the obstinacy and determination of the "opposition" of those days. Pursuing paths of peace in commercial circles was an abnormal condition for some of them, as they always carried the chip on their shoulder. The next year Vanderbilt gave much attention to his new line from New York to Havre, though he had not lost sight of the Nicaragua business, for in 1856 he had gained control again of the company. All this time rates of fare and freight had been lowered by the competition of the three or four lines to California, though Charles Morgan started an opposition for a few months in 1856. As trouble had been brewing in Nicaragua for some time, and a party of filibusters under one Walker had managed to obtain control of affairs in that State, the Nicaragua line run irregularly up to 1858, when it was closed up by the Nicaragua Transit Co. for a time, but was revived at a later date, and continued until late in 1867, when the North American S. S. Co. commenced running their steamships to Panama in opposition to the Pacific Mail Co., when the Nicaragua route was closed for good.

NEW YORK TO BRAZIL, S. A.

The New York and Brazil Mail S. S. Co. opened a line from New York to Brazil, making two or three stops on the way, in January, 1866, with the "North America" x "Fort Jackson," of the blockading fleet during the Civil War, and during the same year the "Guiding Star" for a few months. W. R. Garrison was the directing spirit of this enterprise. The vessels made monthly trips, under a mail contract with the United States government of \$150,000 a year, for ten years. The "South America" x "Connecticut" was added to the line in 1867, and in 1868 the "Merrimac" and the "Mississippi," the two iron-hull propellers built by Harrison Loring, of Boston, Mass. The "Mississippi" was wrecked on Great Pensacola Shoal on a voyage from Rio Janeiro to New York, on May 12th, 1869. The "North America," the "South America," and the "Merrimac" performed the service of the line, and with the addition of the "Erie" and the "Ontario," two wooden-hull steamships built in 1867 for a line from Boston to Liverpool, until September 22d, 1875, when the "Ontario" was the last vessel despatched from New York by the company. The "Erie" was lost by fire on the coast of Brazil on January 1st, 1873.

There was no American line of steamships to Brazil from the sailing of the "Ontario," in 1875, until May, 1878, when the United States and Brazil Mail S. S. Co., which was owned almost wholly by John Roach, and operated by Mallory & Co., opened the line with a chartered vessel until the "City of Para" and the "City of Rio Janeiro" were completed and placed on the line. These vessels were built by the Delaware River Iron S. B. & E. Co., and were each 345'x38'6x30'4, with compound engines 42" and 74" by 60". They were well-equipped vessels, with large passenger accommodations, and much superior to any vessels that had been in that service; in fact, too expensive vessels for that trade. The line met with many obstacles placed in its path by the foreign interests that were affected by the opening of the American line. They had a mail contract with the Brazilian government, giving them a compensation of \$100,000 per annum. The foreign line offered to carry the mail to the United States free of cost, and that failing to break the mail contract, the cutting of freight rates

was resorted to for breaking down the American line. The freight on coffee when the American line was started was 70 cents per bag, and the second year of its operation the rate had been reduced to 30 cents per bag, or \$5.25 per ton for a carriage of 5,200 miles. At the same time the United States government refused to give the line a contract for carrying the mail, compelling them to carry the mail for the sea postage merely. There was not a renewal of the mail contract after the expiration of the two years, but the steamers run for nearly a year after without any mail contract from either government, when they were withdrawn. The two fine steamers were shortly after sold to the Pacific Mail S. S. Co.

In 1882 another company was organized as the United States and Brazil Mail S. S. Co., with C. P. Huntington, John Roach, Charles R. Flint, H. K. Thurber, among the incorporators. They had a mail contract with the Brazilian government for \$100,000 per annum, Brazilian currency, but the want of stability to the foreign currency made it an unknown quantity, and was one drawback the company had to contend against. The Delaware River I. S. B. & E. Co. built for the company three iron-hull vessels, each 295'x38'4x23'4, with compound engine 36" and 66" by 54", and named "Finance," "Advance" and "Reliance." They were smaller vessels than the "City of Para" and "City of Rio Janeiro," and not so large passenger accommodations in proportion to their size. The "Finance" was the first vessel in operation, leaving New York January 27th, 1883, and stopping at Newport News, Va. The steamers made monthly trips with regularity, and did a fairly good business, meeting with no ill fortune until the loss of the "Reliance," in 1884. In 1886 the builders of the other vessels completed for the company the "Alliance," that was 8 feet longer and 4 feet wider than the older vessels. Previous to this Mr. Roach's interest in the company had passed to other hands, and it was not long before there was a change in the management of the company, and, taken by the conclusion, were better that it were not so. In 1890, the same builders constructed two larger and finer vessels than the others of the fleet, having larger passenger accommodations and finer interior finish. They were 321'x45'x17', with triple-expansion engine 28", 44" and 70"x48", and named "Seguranca" and

"Vigilancia." These vessels were subsequently found to have too large passenger accommodations for the route. Previous to this, internal dissensions in the company began to manifest themselves, and the want of good management in the affairs of the company compelled its passing into the hands of a receiver, who wound up the affairs of the company in 1893. The "Finance," "Advance" and "Alliance" were sold by the United States Marshal April 3d, 1893, to parties who passed them over to the Panama R. R. Co., and the "Seguranca" and the "Vigilancia" were sold to the New York and Cuba Mail S. S. Co. It is believed by those well acquainted with the situation that the company would have been prosperous under a wise and economical administration of its affairs.

DETAILS OF SOME COASTWISE STEAMSHIPS.

"Neptune," 1838.—Hull, built by Lawrence & Sneed, of New York, 215'x25'4x14'; one "square" engine, constructed by the Allaire Works, with a cylinder of 50 inches diameter by 11 feet 6 inches stroke; water wheels, 25 feet diameter.

"Northerner," 1847.—Hull, built by William H. Brown, of New York, 205'x32'8x22'6; one side-lever engine, with cylinder 70"x8', built by the Novelty Iron Works.

"Falcon," 1848.—Hull, built by William H. Brown, 206'x30'6x21'; two inclined engines, built by Hogg & Delamater, of New York, each having cylinders 60 inches diameter by 5 feet stroke; water wheels, 32'x7'9.

"Georgia," 1849.—Hull, built by Smith & Dimon, of New York, 248'8x48'8x25'6; with two side-lever engines, built by T. F. Secor & Co., each having cylinders of 90 inches diameter by 8 feet stroke; water wheels, 36'x10'6.

Philadelphia," 1849.—Hull, built at Philadelphia, Pa., 190'x33'x18'3, with two side-lever engines, constructed by Merrick & Towne, of Philadelphia, Pa., each having cylinders of 56 inches diameter by 6 feet 9 inches stroke; water wheels, 27'x8'6.

"Ohio," 1849.—Hull, built by Jeremiah Simonson, at New York, 247'10x45'7x24'6; two side-lever engines, constructed by T. F. Secor & Co., each with a cylinder of 90 inches diameter by 8 feet stroke; water wheels, 36'x10'6; four iron-flue boilers.

"Cherokee," 1849.—Hull, built by William H. Webb, 210'x 35'x22'; one side-lever engine, constructed by the Novelty Iron Works, with a cylinder of 75 inches diameter by 8 feet stroke.

"Eldorado," 1850.—Hull, constructed by Thomas Collyer, of New York, 235'x31'x23'; two vertical beam engines, built by Belknap & Cunningham, each having a cylinder of 50 inches diameter by 10 feet stroke; water wheels, 29'4x8'10.

"Union," 1852.—Hull, built at Philadelphia, Pa., 180'x 25'4x17'; two direct-acting inverted propeller engines, each having cylinder of 34 inches square; propeller with four blades of 10 feet diameter and 31 feet 4 inches pitch.

"Augusta," 1852.—Hull, built by William H. Webb, 220'x 35'x21'6; one oscillating engine, built by Novelty Iron Works, having cylinder 85 inches diameter by 8 feet stroke; two "rising-flue" boilers; water wheels, 30'x10'.

"Nashville," 1853.—Hull, built by Thomas Collyer, 216'x 34'8x22'; one side-lever engine, built by Novelty Iron Works, with a cylinder of 85 inches diameter by 8 feet stroke; two "Miller's" patent return-flue boilers; water wheels, 32'x10'.

"North Star," 1853.—Hull, built by Jeremiah Simonson, 269'6x38'x29'6; two vertical beam engines, constructed by Allaire Works, each with cylinder of 66 inches diameter and 10 feet stroke; four drop-flue boilers; water wheels, with feathering buckets, 33 feet diameter by 8 feet face.

"San Francisco," 1853.—Hull, constructed by William H. Webb, 286'x41'x24'; two inclined oscillating engines, constructed by Morgan Iron Works, each with cylinder of 65 inches diameter and 8 feet stroke; two drop-flue boilers; water wheels, with feathering buckets, of 28 feet diameter and 8 feet face.

"Ocean Bird," 1854.—Hull, built by J. W. Griffith, at New York, 225'x37'x16'; one vertical beam engine, by Neptune Iron Works, of New York, having a cylinder of 65 inches diameter by 12 feet stroke; four return-flue boilers; water wheels, 33'x 7'9.

"Cahawba," 1854.—Hull, constructed by William Collyer, of New York, 260'x37'x19'6; one vertical beam engine, by the Allaire Works, with a cylinder of 75 inches diameter by 11 feet stroke, and two return-flue boilers; water wheels, 31'x8'6.

"Quaker City," 1854.—Hull, built by Vaughan & Lynn, of Philadelphia, Pa., 227'3x36'x21'3, with 12 feet draft at load-water line; one side-lever engine, built by Merrick & Sons, at Philadelphia, Pa., having a cylinder of 85 inches diameter and 8 feet stroke; four return tubular boilers, worked under a maximum steam pressure of 28 lbs.; water wheels, 30'4 diameter and 10 feet face.

"Ariel," 1855.—Hull, built by Jeremiah Simonson, 250'x33'6x19'; one vertical beam engine, built by Allaire Works, with a cylinder of 75 inches diameter by 11 feet stroke of piston; two return-flue boilers; water wheels, 33 feet diameter by 8 feet face.

"Columbia," 1857.—Hull, built by Thomas Collyer, at New York, 230'x35'x23; one side-lever engine, constructed by the Novelty Iron Works, with a cylinder of 85 inches diameter and 9 feet stroke of piston.

"Ocean Queen," 1858.—Hull, built by J. A. Westervelt & Sons, of New York, 330'x42'x22', with draft of water at load line of 15 feet 6 inches; one vertical beam engine, built by the Morgan Iron Works, having a cylinder of 90 inches diameter by 12 feet stroke; three return-flue boilers; paddle wheels, 38 feet diameter by 10 feet 6 inches face.

"R. R. Cuyler," 1859.—Hull, built by Samuel Sneed, at Greenpoint, N. Y., 235'x32'x23'3; one vertical direct-acting propeller engine, constructed by the Allaire Works, having a cylinder of 70 inches diameter by 48 inches stroke; two horizontal tubular boilers, operated under a steam pressure of 25 lbs. per square inch, and cutting off in cylinder at half stroke; propeller, four blades of 16 feet diameter and 22 feet 6 inches pitch.

"Yorktown," 1859.—Hull, built by William H. Webb, 250'x34'x17'; two vertical beam engines, built by the Morgan Iron Works, each with cylinders of 50 inches diameter by 10 feet stroke of piston; two return-flue boilers; paddle wheels, 30'x9'.

"Champion," 1859.—Iron hull, built by Harlan & Hollingsworth Co., of Wilmington, Del., 242'x35'x25'10; draft of water when light, 10 feet; two vertical beam engines, by builders of the hull, each having a cylinder of 42 inches diameter by 10

feet stroke; paddle wheels, 30 feet diameter by 6 feet 6 inches face.

"San Jacinto," 1860.—Iron hull, built by Harlan & Hollingsworth Co., at Wilmington, Del., 230'x33'x15'; one vertical beam engine, by builders of the hull, having a cylinder of 56 inches by 11 feet stroke; water wheels, 31 feet diameter by 7 feet 8 inches face.

"Matanzas," 1860.—Iron hull, built by Delamater Iron Works, of New York, 205'x29'6"x20'9'; draft, loaded, 13 feet; one vertical direct-acting propeller engine, with cylinder of 56 inches diameter by 45 inches stroke; propeller, 14 feet diameter by 22 feet pitch.

"Constitution," 1861.—Hull, by William H. Webb, 333'x44'x31'6'; one vertical beam engine, built by Novelty Iron Works, having cylinder of 105 inches diameter by 12 feet stroke of piston; water wheels, 40 feet diameter by 18 feet face.

Of the fleet of ten of these large side-wheel steamships built for the Pacific Mail S. S. Co., William H. Webb constructed five, Henry Steers three, and Webb & Bell two, sub-contracted from William H. Webb. They were all of nearly the same general dimensions of the hull, with the same size of engine.

"Morro Castle," 1864.—Hull, built by Westervelt & Mackay, at New York, 260'x40'x23'; one vertical beam engine, from steamboat "City of Buffalo," on Lake Erie, with cylinder 76 inches by 12 feet stroke.

"Rising Star," 1865.—Hull, built by Roosevelt & Joyce, of New York, 303'x43'x23'; one vertical beam engine, having a cylinder of 100 inches diameter by 12 feet stroke, constructed by the Etna Iron Works, John Roach, at New York.

"Colon," 1872.—Hull, built by John Roach & Sons, 282'x40'x30'6'; one compound engine built by John Elder Co., at Glasgow, Scotland, with cylinders of 50 inches and 86 inches by 42 inches stroke; working steam pressure, 60 lbs.; propeller, 16 feet 3 inches diameter.

"George W. Clyde," 1872.—Hull, built by William Cramp & Sons' S. & E. B. Co., of Philadelphia, Pa., 206'x35'x19'; one compound engine, with cylinders of 24 inches and 38 inches by 36 inches stroke.

"City of Peking" and "City of Tokio," 1874.—Hulls, built by Delaware River Iron Shipbuilding and Engine Works—John Roach & Sons—at Chester, Pa., 423'x47'4x38½'; two compound engines in each, having cylinders 51 inches and 88 inches diameter by 54 inches stroke, worked under an initial steam pressure of 60 lbs.; propeller, 20 feet 3 inches diameter.

"Columbus," 1874.—Hull and machinery built by William Cramp Ship and Engine Building Co., at Philadelphia, Pa. Hull, 276'x35'x24'; one compound engine, with cylinders of 34 inches and 56 inches by 42 inches stroke.

"Hudson," 1874.—Hull and machinery built by the Pusey & Jones Company, at Wilmington, Del. Hull, 280'x34'x25'9; one inverted simple-condensing engine, 48 inches cylinder by 72 inches stroke of piston.

"Lone Star" x "Brashear" and "New York," 1875; "Algiers" and "Morgan City," 1876.—Hull and machinery built by the Harlan & Hollingsworth Co. Hull, 275'x38'4x22'9; one vertical direct-acting surface condensing engine, with a cylinder of 50 inches diameter and 60 inches stroke, worked under a steam pressure of 60 lbs.; fuel, 24 tons per day; propeller, 13 feet diameter.

"Rio Grande," 1876.—Hull and machinery built by Delaware River I. S. & E. Works. Hull, 289'6x38'7x22'6; one compound engine, with cylinders of 34 inches and 60 inches by 54 inches stroke.

"Saratoga," 1877.—Hull and machinery built by Delaware River I. S. & E. Works. Hull, 272'x38'x24'; one compound engine, with cylinders of 34 inches and 60 inches by 54 inches stroke, operated under a pressure of 80 lbs.; propeller, 14 feet 3 inches diameter.

"City of Washington," 1877.—Hull and machinery constructed by John Roach & Sons, at Chester, Pa., Delaware River I. S. & E. Works. Hull, 300'x38'x27'; one compound engine, with cylinders of 40 inches and 74 inches by 72 inches stroke. Subsequently a triple-expansion engine was placed in the vessel, having cylinders of 24 inches, 38 inches and 63 inches by 60 inches stroke of piston; propeller, 16 feet diameter.

"City of Rio Janeiro" and "City of Para," 1878.—Hull and machinery built by John Roach & Sons, at Chester, Pa.,

345'10x38'6x30'4; one compound engine, having cylinders of 42½ inches and 74 inches by 60 inches stroke; subsequently a triple-expansion engine, having cylinders of 28 inches, 44 inches and 70 inches by 48 inches stroke, was placed in each vessel; propeller, 16 feet 4 inches diameter.

"City of Alexandria," 1879.—Hull and machinery constructed by John Roach & Son, at Chester, Pa., 333'x38'6x25'; one compound engine, having cylinders of 42 inches and 78 inches by 54 inches stroke; propeller, 16 feet diameter.

"City of Augusta," 1880.—Hull and machinery built by John Roach & Sons, at Chester, Pa., 323'x40'x25'9; one compound engine, with cylinders 42 inches and 82 inches by 54 inches stroke. At a later date a triple-expansion was fitted in the vessel in place of the compound engine, having cylinders of 22 inches and 41 inches and 72 inches by 54 inches stroke.

"Louisiana," 1880.—Hull, constructed by John Roach & Sons, at Chester, Pa., 324'x39'x26'; one pair of vertical beam compound propeller engines, set athwartships, the crank being connected to the beam by a rod that was fastened to a "horn" forged on the underside of the beam strap. The high-pressure cylinder was 30 inches diameter by 7 feet 3 inches stroke, and the low-pressure cylinder 56 inches diameter by 6 feet stroke. There were eight tubular boilers, each 12 feet 2 inches in length and 8 feet 6 inches diameter, with 3-inch tubes 10 feet long, of John Baird's patent. These boilers were at first connected by iron water spaces 6 inches wide, but after a few years' use these water spaces were partially removed and fire-brick built up the height of removed water spaces. These boilers did not prove to be as economical in fuel as the ordinary marine boilers. A few years since this pair of compound engines were removed and a triple-expansion engine substituted in their place, having cylinders of 24 inches and 39 inches and 64 inches by 45 inches stroke.

"City of Puebla," 1881.—Hull and machinery built by The William Cramp & Sons S. & E. B. Co., 319'x38'6x26'3; one compound engine, with cylinders of 43 inches and 86 inches by 60 inches stroke.

"Lampasas," 1883.—Hull and machinery built by John Roach & Sons, at Chester, Pa., 329'x40'5x21'5; one triple-ex-

pansion engine, with cylinders of 23 inches and $37\frac{1}{2}$ inches and $61\frac{1}{2}$ inches by 39 inches stroke.

"Olivette," 1887.—Hull and machinery constructed by The William Cramp & Sons S. & E. B. Co., $280'\times 35'\times 19'$; one triple-expansion engine, with cylinders of 23 inches and 36 inches and 60 inches by 36 inches stroke.

"City of Birmingham," 1888.—Hull and machinery constructed by John Roach & Sons, at Chester, Pa., $300'\times 42'\times 26'9$; one triple-expansion engine, having cylinders of 24 inches and 38 inches and 63 inches, and 45 inches stroke.

"Kansas City," 1889.—Hull and machinery built by Delaware River I. S. B. & E. Works, at Chester, Pa., $327'\times 45'\times 18'8$; one triple-expansion engine, with cylinders of 33 inches and 54 inches and 86 inches by 54 inches stroke.

"Sabine" x "Leona," 1889.—Hull and machinery built by Delaware River I. S. B. & E. Works, at Chester, Pa., $314'\times 46'2\times 20'3$; one triple-expansion engine, with cylinders of 28 inches and 44 inches and 70 inches by 48 inches stroke.

"Algonquin," 1890.—Hull and machinery constructed by William Cramp & Sons S. E. B. Co., $276'\times 43'\times 19'$; one triple-expansion engine, with cylinders of 21 inches and 34 inches and 56 inches by 36 inches stroke.

"El Sol," 1890.—Hull and machinery constructed by Newport News Shipbuilding and Dry Dock Co., $390'6\times 46'8\times 24'$; one triple-expansion engine, having cylinders 32 inches and 52 inches and 84 inches by 54 inches stroke.

"El Rio" and "El Sud," 1892.—Hull and machinery constructed by Newport News Shipbuilding and Dry Dock Co., $380'\times 48'\times 23'10$; one triple-expansion engine, with cylinders 32 inches and 52 inches and 84 inches by 54 inches stroke; propeller, 18 feet diameter.

"Jamestown," 1894.—Hull and machinery built by Delaware River I. S. B. & E. Works, $300'\times 40'\times 26'9$; one triple-expansion engine, 28 inches and 44 inches and 73 inches diameter of cylinders by 54 inches stroke.

"Comanche," 1895.—Hull and machinery built by William Cramp & Sons S. & E. B. Co., $300'\times 46'\times 26'3$; one quadruple-expansion engine, having cylinders of $24\frac{1}{2}$ inches and $34\frac{1}{2}$ inches and $49\frac{1}{2}$ inches and 70 inches by 36 inches stroke.

"Havana," 1898; "Mexico," 1899.—Hull and machinery constructed by William Cramp & Sons S. & E. B. Co., 360'x50'x32'2; twin screw, two triple-expansion engines, each with cylinders of 25 inches and 41½ inches and 68 inches by 42 inches stroke.

"El Cid" and "El Rio," 1899.—Hull and machinery constructed by Newport News Shipbuilding & Dry Dock Co., 379'7x48'x26'; one triple-expansion engine, with cylinders of 32 inches and 52 inches and 84 inches by 54 inches stroke.

"Jefferson" and "Hamilton," 1899.—Hull and machinery built by Delaware River I. S. B. & E. Works, 304'x42'x27'; one triple-expansion engine, with cylinders of 27 inches and 44½ inches and 73 inches by 54 inches stroke.

"Morro Castle," 1900.—Hull and machinery built by William Cramp & Sons S. & E. B. Co.; twin screw; 400'x50'x25'9; two four-cylinder triple-expansion engines, each having cylinders of 32 inches and 52 inches and 60 inches and 60 inches by 42 inches stroke; propellers, 3 blades, 14 feet diameter and 22 feet 6 inches pitch.

"Comus," 1900.—Hull and machinery constructed by Newport News Shipbuilding & Dry Dock Co., 379'x48'x27'6; one triple-expansion engine, having cylinders of 32 inches and 52 inches and 84 inches by 54 inches stroke.

"Proteus," 1900.—Hull and machinery built by Newport News Shipbuilding & Dry Dock Co., 379'7x48'x29'9; one triple-expansion engine, with cylinders of 32 inches and 52 inches and 84 inches by 54 inches stroke.

DISASTERS TO COASTWISE STEAMSHIPS.

"Ariadne."—New York to New Orleans. Stranded off Devil Hill, on coast of North Carolina, February 7th, 1873, and became a total loss; thick fog and high winds prevailing at the time.

"Allentown."—Foundered during a gale in Massachusetts Bay, November 25th, 1888, with a loss of all her officers and crew of 18 men.

"Bienville."—New York to New Orleans. Took fire when at sea near Watlings Island, on August 15th, 1872, totally destroying the vessel with a loss of 41 lives.

"City of Waco."—Mallory's New York and Galveston line. While lying off the bar at Galveston, Texas, November 8th, 1875, was found to be on fire, but on account of the high sea prevailing at the time no assistance could be rendered. There were 17 passengers and a crew of 32 men, all of whom were lost. Total loss of vessel and cargo, \$597,000.

"City of Galveston."—Mallory & Co.'s line. While on a voyage from Hayti to New York, was lost on the island of Marra-guana, on February 4th, 1876. The vessel, valued at \$125,000, was a total loss.

"City of Alexandria."—New York & Cuba Mail S. S. Co. On November 1st, 1893, an explosion took place in its cargo of rum and alcohol, the vessel becoming a total loss after being beached 13 miles east of Havana, Cuba. There were 5 men drowned. When the explosion took place the vessel was about 30 miles from Havana.

"Central America."—New York and Chagres. Foundered in a severe gale while on a passage to New York via Havana, on September 12th, 1857, and about 423 lives were lost.

"City of Savannah."—Boston to Savannah. Foundered off Hunting Island, S. C., in a hurricane, August 28th, 1893. Vessel total loss; no lives lost.

"City of Merida."—Alexandre's line. Destroyed by fire in the harbor of Havana, Cuba, September 4th, 1884. No lives lost, nor any persons injured.

"City of Columbus."—Boston to Savannah, January 18th, 1884, went into the Devils Bridge rocks, near Gay Head, and became a total loss. With 87 passengers and a crew of 45 persons, there was a loss of 75 passengers and 28 of the crew.

"City of New York."—Alexandre's line. Took fire from some unknown cause while lying at Roberts' pier, Brooklyn, on June 23d, 1880, and was towed from there into the stream, and after burning for eleven hours the hulk sank in the river.

"City of Vera Cruz."—Left New York bound for Havana, on August 25th, 1880. On the 28th, encountered a heavy squall, which increased so that by 3 p. m., in a heavy sea,

the captain and a number of the officers and crew were washed overboard, and at 5 o'clock the vessel went down off Mosquito Inlet, Fla. By this disaster 26 passengers and 42 of the crew were lost. The only officer saved was Charles Smith, second assistant engineer.

"Cleopatra."—Went ashore on October 23d, 1878, while entering Nassau Harbor, N. P., in charge of a pilot. Was so badly damaged that she was abandoned in March, 1879.

"Chesapeake."—While on a trip from Portland, Me., to New York, on April 27th, 1881, stranded on the south side of Fisher's Island, in Long Island Sound, in a thick fog, and became a total loss.

"Croatan."—New York to Wilmington, N. C., November 1st, 1898. Fire was discovered in the cargo that the crew of the vessel were unable to control, and the vessel was abandoned. Loss of 4 of the crew and one passenger.

"City of Houston."—Foundered at sea off Frying Pan Shoals, on October 23d, 1878, and was a total loss. All the passengers and crew were landed at Fernandina, Fla.

"Cherokee."—New York and New Orleans. Burned at her wharf at New York, August 26th, 1853. No lives lost.

"Crescent City."—Wrecked on a reef in the Gulf of Mexico.

"Creole."—Was wrecked on the New Jersey coast, March 17th, 1868, on a trip from Havana, during a thick fog.

"Delaware."—New York and Charleston, S. C. July 8th, 1898, fire was discovered in the cargo first night out; efforts were made to control the blaze, but proved unavailing, and the vessel was abandoned. Passengers were taken to New York by tug "Ocean King," and the crew took to their boats. No one injured.

"Eagle."—New York to Havana. Went ashore on Body Island, North Carolina, March 4th, 1870, and became a total loss during heavy weather on the coast.

"Evening Star."—New York and New Orleans line. Was lost in a cyclone about 100 miles to the eastward of Tybee Island, on October 3d, 1866. Over a hundred lives lost.

- "Erie."—Rio Janeiro to New York. Took fire on January 1st, 1873 when off Parahaba, 90 miles north of Pernambuco, and was totally destroyed. No lives lost.
- "Emily B. Souder."—Foundered at sea December 10th, 1878, and was a total loss. There were 37 lives lost—nine passengers and 28 of the crew.
- "George Cromwell."—New York and St. Johns, N. F. Struck on keys off Cape St. Mary, N. F., January 5th, 1877, and became a total wreck. All on board were lost, consisting of 23 crew and 7 passengers. Supposed causes of disaster, currents, fog and snow.
- "George Washington."—Struck the rocks near French Mistaken Point, N. F., January 20th, 1877, and became a total wreck. All on board were lost, 23 crew and 2 passengers. Causes supposed to be the same as in case of "George Cromwell."
- "General J. K. Barnes."—Foundered at sea off Cape Hatteras from a leak during a heavy storm, on October 23d, 1878. Crew taken off by a schooner and landed at Charleston, S. C.
- "Guadeloupe."—Stranded on Barnegat Shoals, November 19th, 1884. No lives lost. Mallory's New York and Galveston line.
- "Georgia."—While on a voyage from New York to San Francisco, June 23, 1876, when passing through the Straits of Magellan, went ashore on the outer point of Rocky Point, during a dense fog.
- "George Appold."—While on a passage from Providence, R. I., to Newport News, Va., January 9th, 1889, stranded upon Montauk Point and became a total loss.
- "Huntsville."—Burned at sea December 19th, 1877, when about 10 miles southeast of Little Egg Harbor light. Officers and crew picked up by pilot boat "Washington."
- "Isaac Bell."—Was burned while lying at her wharf at Norfolk, Va., receiving cargo, on October 2d, 1880. Loss, \$200,000.
- "John Hopkins."—Destroyed by fire in Baltimore harbor, May 28th, 1889.

"Knoxville."—Burned at her wharf in New York, on December 22d, 1856, and became a total loss.

"Leo."—Burned at sea April 13th, 1877, and became a total loss. Loss of 20 of the crew and 3 passengers.

"Montgomery."—Lost by collision on January 7th, 1877, off the capes of the Delaware, with s. s. "Seminole." There were 13 lives of the crew and 4 passengers lost.

"Morro Castle."—Burned at her wharf at Charleston, S. C., March 6th, 1883.

"Merrimac."—From Halifax to Boston. On July 10th, 1887, during foggy weather, struck a ledge near Little Hope Island, Nova Scotia, and became a total wreck.

"Metropolis."—On January 31st, 1878, was wrecked on Currituck Beach, North Carolina, with a loss of 90 lives. The vessel encountered a heavy northeast gale while on her way from Philadelphia, Pa., to South America.

"Missouri."—New York to Havana. When 25 miles northeast of the Island of Abaco, Bahamas, on October 22d, 1872, took fire and was totally destroyed, by which 69 persons lost their lives.

"Mariposa."—New Orleans to New York. Sailed October 5th, 1870, and is supposed to have been lost about 9th of same month on east coast of Florida. No passengers on board at time of disaster. The crew of 35 persons were never heard from afterwards.

"Matanzas."—New Orleans to New York. Was burned at sea November 15th, 1868.

"Mississippi."—Was wrecked on Great Pensacola Shoal on May 12th, 1869, while on a voyage from Rio Janeiro to New York.

"Patapsco."—New York to Savannah. Burned at sea September 12th, 1868.

"Portland."—Boston to Portland, Me. Foundered during a heavy northeast gale November 27th, 1898, in vicinity of Cape Cod, where 127 lives were lost—60 passengers and 67 of the crew. None were left to tell the tale.

"Reliance."—New York and Brazil line. Was wrecked outside the harbor of Bahia, Brazil, on April 12th, 1884, when on a voyage from Rio Janeiro to New York, and became a total loss. No lives lost. Part of the cargo saved.

"Regulator."—Burned at her wharf at Wilmington, N. C., October 19th, 1887.

"Rebecca Clyde."—Baltimore to Charleston, S. C. Was driven ashore on September 17th, 1876, off Portsmouth Island, and went to pieces. There were twelve persons lost their lives, including the officers of the vessel.

"Raleigh."—Was burned at sea, December 24th, 1867, where 14 of the passengers and 10 of the crew lost their lives.

"San Jacinto."—Was wrecked on Body Island, North Carolina, on August 9th, 1869, when on a voyage from New York to Savannah, Ga.

"Star of the Union."—Was wrecked on Colorado Reef, off the Island of Cuba, November 13th, 1868.

"St. Louis."—New Orleans to New York. Sprung a leak and foundered December 9th, 1872. No lives lost. Supposed to have struck the wreck of a sunken vessel shortly after leaving New Orleans.

"Sherman."—Merchants' line, New York to New Orleans. When about 20 miles from Cape Fear light foundered, on January 10th, 1874.

"Saragossa."—Foundered at sea about 200 miles east of Cape Canaveral, March 23d, 1887. Sprung a leak during a heavy gale. Officers and crew were taken from their lifeboats on board an English bark and landed at Bermuda.

"Tropic."—Lost on Bird Rock Reef, West Indies, on June 28th, 1883, while on a voyage from Philadelphia to Port Antonio.

"Vicksburg."—Struck on Fire Island, Long Island, during a thick fog, on February 25th, 1875, while on a trip from Port Royal, S. C., to New York, and became a total loss.

RECORD TIME OF COASTWISE STEAMSHIPS.

NEW YORK TO NEW ORLEANS.

Prior to 1865 most all the steamships to or from New York and New Orleans stopped at Havana, Cuba.

1865. May 31st, "Guiding Star," from Southwest Pass to New York, 5 days 13 hours.
July 1st, "Guiding Star," from Southwest Pass to New York, 5 days 10 hours.
July 28th, "Guiding Star," from dock to dock at New York, 5 days 10 hours.
July 28th, "George Washington," from dock to dock at New York, 5 days 20 hours.
1868. June 27th, "Crescent City," from Southwest Pass to dock at New York, 6 days 4 hours and 30 minutes.
1873. December 13th, "Knickerbocker," from Sandy Hook to Southwest Pass, 6 days 3 hours.
1874. February 7th, "Knickerbocker," from Sandy Hook to Southwest Pass, 5 days 20 hours and 40 minutes.
May 17th, "Knickerbocker," from bar to bar at New York, 5 days 6 hours and 40 minutes.
November 7th, "Hudson," from bar to bar at New Orleans, 5 days 19 hours and 15 minutes.
1875. July 14th, "Hudson," from Southwest Pass to dock at New York, 5 days 9 hours.
August 7th, "Hudson," from dock to dock at New York, 5 days 4 hours; bar to bar, 4 days 22 hours.
1876. July 18th, "Knickerbocker," Southwest Pass to New York, 5 days 12 hours 30 minutes.
1880. February, "Chalmette," from Sandy Hook to dock at New Orleans, 6 days 7 hours and 10 minutes.
May 23d, "Louisiana," from bar to New York, 5 days 5 hours and 30 minutes.
July 12th, "Louisiana," from dock to dock at New York, 4 days 19 hours and 36 minutes.
July 23d, "Louisiana," from dock to dock at New Orleans, 5 days 17 hours and 30 minutes.

1884. June 21st, "Excelsior," bar to bar at New Orleans, 5 days 14 hours and 30 minutes.
July 25th, "Louisiana," dock to dock at New Orleans, 5 days 11 hours; bar to bar, 5 days 3 hours.
August 16th, "Louisiana," dock to dock at New Orleans, 5 days 10 hours and 45 minutes.
November 10th, "Eldorado," bar to Southwest Pass, or bar, 5 days and 9 hours.
1885. December 23d, "Eldorado," dock to dock at New Orleans, 5 days 6 hours and 55 minutes.
December 31st, "Eureka," dock to dock at New Orleans, 5 days and 1 hour; bar to bar, 4 days 17 hours and 30 minutes.
1893. August, "El Cid," bar to bar at New York, 4 days 2 hours and 15 minutes.
August, "El Norte," bar to bar at New York, 4 days 2 hours and 10 minutes.
August, "El Sol," bar to bar at New York, 4 days 2 hours and 21 minutes.
1897. July, "El Rio," bar to bar at New York, 3 days 23 hours and 37 minutes.
July, "Creole," bar to bar at New York, 4 days 2 hours and 25 minutes.
August, "El Rio," bar to bar at New York, 3 days 20 hours and 37 minutes.
August, "El Rio," bar to bar at New York, 4 days and 4 hours.
1899. January, "Louisiana," bar to bar at New Orleans, 4 days and 17 hours.
1900. June, "Proteus," dock to dock at New Orleans, 4 days 20 hours and 30 minutes.
August 5th, "Proteus," dock to dock at New York, 4 days 5 hours and 56 minutes.
August 22d, "Proteus," bar to bar, New Orleans to New York, 3 days 21 hours and 10 minutes; dock to dock, 4 days 4 hours and 28 minutes.
1901. December 12th, "Proteus," New York to New Orleans, dock to dock, 4 days 16 hours and 23 minutes.

1902. March 1st, "Proteus," New York to New Orleans, dock to dock, 4 days 15 hours and 25 minutes.

HAVANA AND NEW YORK.

1856. June 24th, "Ocean Bird," Havana to New York, 4 days and 4 hours.
1857. June 10th, "Black Warrior," Havana to New York, 4 days and 12 hours.
1859. July 5th, "Quaker City," Havana to New York, 3 days and 14 hours.
- August 12th, "Quaker City," Havana to New York, 3 days and 20 hours.
1860. March, "Quaker City," Havana to New York, 3 days and 21 hours.
1861. April, "Cahawba," Havana to New York, 4 days and 18 hours.
1865. May 24th, "Morro Castle," Havana to New York, 3 days and 23 hours.
- June 4th, "Morro Castle," New York to Havana, 4 days and 7 hours.
- July 5th, "Morro Castle," Havana to New York, 3 days and 15 hours.
1866. April 5th, "Morro Castle," Havana to New York, 3 days and 15 hours.
1868. May 14th, "Eagle," Havana to New York, 4 days.
- June 14th, "Bienville," Havana to New York, 4 days and 12 hours.
1870. May 6th, "Rapidan," Havana to New York, 4 days and 8 hours.
1872. "City of Merida," Havana to New York, 3 days 11 hours and 30 minutes.
1873. February 5th, "City of Havana," Havana to New York, 3 days and 19 hours.
- February 28th, "City of Merida," New York to Havana, 4 days 3 hours and 30 minutes.
1874. May, "Columbus," New York to Havana, bar to bar, 4 days 1 hour and 30 minutes.
1879. July, "City of Washington," Havana to New York, 3 days and 3 hours.

1880. January, "City of Alexandria," Havana to New York, 3 days 7 hours and 20 minutes.
February, "City of Washington," New York to Havana, 3 days and 13 hours.
April, "Niagara," New York to Havana, 3 days 23 hours and 30 minutes.
May, "Saratoga II.," New York to Havana, 3 days and 15 hours.
June, "Saratoga II.," Havana to New York, 3 days 10 hours and 20 minutes.
1881. June, "Newport," New York to Havana, bar to bar, 3 days 12 hours and 15 minutes.
1883. January 12th, "City of Puebla," Havana to New York, 3 days and 3 hours.
July 5th, "City of Puebla," Havana to New York, 2 days 23 hours and 39 minutes.
1885. "City of Puebla," Havana to New York, 2 days 22 hours and 20 minutes.
1899. June 3d, "Havana," Havana to New York, bar to bar, 2 days 15 hours and 50 minutes.
July 8th, "Mexico," Havana to New York, bar to bar, 2 days 15 hours and 40 minutes.
1900. August, "Havana," Havana to New York, bar to bar, 2 days 15 hours and 35 minutes.
December 1st, "Morro Castle," Havana to New York, bar to bar, 2 days 14 hours and 32 minutes.
1901. March 2d, "Morro Castle," New York to Havana, bar to bar, 3 days and 1 hour.
April 6th, "Mexico," New York to Havana, bar to bar, 3 days 3 hours and 40 minutes.
June 29th, "Morro Castle," Havana to New York, bar to bar, 2 days 13 hours 41 minutes.
July 20, "Mexico," Havana to New York, bar to bar, 2 days and 17 hours.
July 24th, "Havana," New York to Havana, bar to bar, 3 days 11 hours and 13 minutes.
August 6th, "Monterey," Havana to New York, bar to bar, 2 days 19 hours and 26 minutes.

1901. August 13th, "Havana," Havana to New York, bar to bar, 2 days 17 hours and 3 minutes.
August 24th, "Mexico," New York to Havana, bar to bar, 3 days 11 hours and 10 minutes.
August 27th, "Esperanza," Havana to New York, bar to bar, 2 days 23 hours and 4 minutes.
October 30th, "Esperanza," New York to Havana, bar to bar, 3 days 10 hours and 57 minutes.
November 6th, "Monterey," New York to Havana, bar to bar, 3 days 12 hours and 55 minutes.
1903. July 7th, "Morro Castle," Havana to New York, dock to dock, 2 days 20 hours; bar to bar, 2 days 17 hours and 11 minutes.

NEW YORK AND SAVANNAH, GA.

1856. May, "Knoxville," to New York, 2 days 13 hours.
June, "Knoxville," to New York, 2 days 10 hours.
1857. November, "Augusta," to New York, 2 days 8 hours and 30 minutes.
December, "Florida," to New York, 2 days 10 hours.
1858. February, "Florida," to New York, 2 days 12 hours.
June, "Montgomery," to New York, 2 days 14 hours.
June, "Huntsville," to New York, 2 days 15 hours.
June, "Huntsville," to New York, 2 days 12 hours.
1861. February, "R. R. Cuyler," to New York, 2 days 9 hours.
1865. December, "San Jacinto," to New York, 2 days 20 hours.
December, "San Salvador," to New York, 2 days 16 hours.
1866. March, "San Jacinto," to New York, 2 days 17 hours.
April, "Herman Livingston," to New York, 2 days 11 hours.
- "City of Columbus," to New York, 1 day 23 hours and 30 minutes.
- "Kansas City," to New York, 1 day 18 hours.
- "La Grande Dutchess," Lightship to Martins Industry Light Vessel, 1 day 14 hours and 20 minutes.

NEW YORK AND CHARLESTON, S. C.

1855. March, "Nashville," to New York, bar to bar, 45 hours.
 October, "Nashville," to New York, 56 hours.
1856. May, "James Adger," to New York, 50 hours.
 May, "Nashville," to New York, 50 hours.
 June, "Nashville," to New York, 49 hours.
 October, "Nashville," to New York, 50 hours.
1857. October, "James Adger," to New York, 52 hours.
 November, "Columbia," to New York, 49 hours.
 December, "Columbia," to New York, 50 hours.
 December, "Nashville," to New York, 52 hours.
 December, "Marion," to New York, 54 hours.
1858. January, "Columbia," to New York, 49 hours.
 April, "Columbia," to New York, 50 hours.
 June, "Columbia," to New York, 47 hours.
 June, "Columbia," to New York, 48 hours.
 August, "Columbia," to New York, 48 hours.
1865. May, "Granada," to New York, 67 hours.
 October, "Emily B. Souder," to New York, 62 hours.
1866. April, "Emily B. Souder," to New York, 60 hours.
 April, "Emily B. Souder," to New York, 60 hours.
 April, "Saragossa," to New York, 59 hours.
 May, "Quaker City," to New York, 58 hours.
1870. January, "Charleston," to New York, 50 hours.
1874. July, "Manhattan," to New York, 55 hours.
1875. "South Carolina," to New York, 52 hours.
1876. "Georgia," to New York, 54 hours.
1896. March, "Comanche," bar to bar, 41 hours 30 minutes.
1901. April 28th, "Comanche," dock to dock, 43 hours and 13 minutes.
 November, "Comanche," dock to dock, 43 hours.

The other propellers of the present Clyde line make the voyage in 52 hours, average time; minimum, 48 hours.

NEW YORK TO GALVESTON, TEXAS.

1866. February, "Saragossa," New York to Galveston, 8 days 19 hours.
1872. "City of Houston," New York to Galveston, 7 days 8 hours 35 minutes.

1874. "City of Waco," Galveston to New York, 6 days 18 hours 40 minutes.
1880. June, "Rio Grande," Galveston to New York, 5 days 19 hours 30 minutes.
1896. January, "Comal," New York to Galveston, 5 days 20 hours.
1897. July, "Lampasas," Galveston to New York, 5 days 8 hours.
1900. July, "Comal," Galveston to New York, 5 days 9 hours.
1902. January, "Denver," bar to bar, Galveston to New York, 5 days 6 hours 45 minutes.
August 20th, "El Alba," bar to bar, Galveston to New York, 4 days 20 hours 38 minutes.
August 20th, "El Alba," dock to dock, Galveston to New York, 5 days and 35 minutes.
1903. July 23d, "Denver," bar to bar, Galveston to New York, 4 days 23 hours 5 minutes.

NEW YORK AND ASPINWALL, PANAMA.

1852. April, "Illinois," Aspinwall to New York, 7 days 8 hours and 40 minutes.
May, "Illinois," Aspinwall to New York, 7 days and 13 hours.
1855. "George Law," Aspinwall to New York, 7 days and 22 hours.
1858. February, "North Star," Aspinwall to New York, 7 days 8 hours and 30 minutes.
1860. "Baltic," Aspinwall to New York, 6 days and 21 hours.
1865. September 23d, "New York," Aspinwall to New York, 6 days 11 hours and 30 minutes.
1866. "Santiago de Cuba," Aspinwall to New York, 6 days 11 hours and 30 minutes.
April, "Henry Chauncey," Aspinwall to New York, 8 days.
"Arizona," Aspinwall to New York, 7 days and 15 hours.
1868. June, "Ocean Queen," Aspinwall to New York, 7 days and 14 hours.
June, "Guiding Star," Aspinwall to New York, 7 days and 19 hours.

1874. July, "City of Panama," Aspinwall to New York, 8 days.
 September, "Acapulco," Aspinwall to New York, 7 days
 and 12 hours.
1876. July, "Acapulco," Aspinwall to New York, 7 days and
 20 hours.

CHARTERED STEAM VESSELS DURING CIVIL WAR.

A few of the larger steamships that were chartered during the Civil War by the Quartermasters' Bureau of the War Department, with the rate per day, that included everything furnished by the owners of the vessel, excepting coal. Charters varied from a few weeks to several months.

"Alabama," 1862, \$1,000 per day. "Arago," 1863, \$1,200 per day; 1865, \$1,000 per day. "Ariel," 1861, \$1,100 per day; 1865, \$800 per day. "Atlantic" and "Baltic," each, 1861, \$1,500; 1863, \$1,200; 1865, \$1,000 per day. "General J. K. Barnes," 1865, \$614 per day. "Blackstone," 1863, \$550; 1865, \$450 per day. "Cahawba," 1861, \$600; 1862, \$800; 1863, \$650 per day. "Champion," 1865, \$400 to \$600 per day. "Coatzacoalcas," 1861, \$1,200; 1862, \$1,400 per day. "Columbia," 1861, \$1,000 per day. "Constitution," 1862, \$2,500 per day. "Continental," 1863, \$600 per day. "Creole," 1865, \$553 per day. "Ben De Ford," 1861, \$750 per day. "Empire City," 1861, \$1,000; 1863, \$800 per day. "Ericsson," 1862, \$1,200; 1864, \$750 per day. "Euterpe," 1864, \$370 per day. "Fulton," 1862, \$1,500; 1865, \$1,200 per day. "Illinois," 1861, \$1,500; 1863, \$1,200; 1864, \$1,000 per day. "Liberty," 1864, \$560 per day. "Herman Livingston," 1865, \$590 per day. "Marion," 1861, \$1,000; 1862, \$800 per day. "Matanzas," 1862, \$800; 1865, \$400 per day. "Merrimac," 1862, \$1,350; 1863, \$850 per day; "Mississippi," same as "Merrimac." "North Star," 1862, \$1,200; 1864, \$850 per day. "Northern Light," same as "North Star." "Ocean Queen," 1862, \$2,000 per day. "S. R. Spaulding," 1861, \$650 per day. "Star of the West," 1861, \$1,000 per day. "State of Georgia," 1861, \$600 per day. "Suwo-Nada," 1865, \$810 per day. "Thomas Swann," 1861, \$300; 1864, \$200 per day. "United States," 1862, \$900; 1864, \$600 per day. "Vanderbilt," 1862, \$2,000 per day. "Varuna," 1865, \$300 per day. "Daniel Webster," 1861, \$900;

1865, \$400 per day. "Western Metropolis," 1865, \$650 per day. "Yazoo," 1865, \$600 per day.

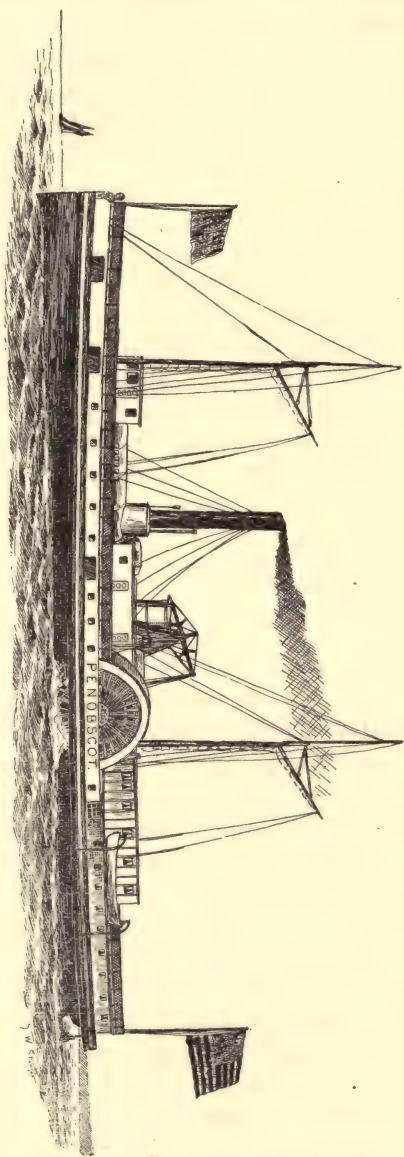
It will be noticed that the rate per day for these vessels were very much higher in 1861, the year the war commenced, than they were later. At first the Navy Department purchased many of the vessels that were thought suitable for blockading and other purposes, and the comparatively few that were left the War Department, they were compelled to pay high rates for charter to transport the war material and supplies to the different points along the coast where the armies were located. Many merchant vessels were built during the first two years of the war, and during the remaining period of the conflict there were so many more vessels placed at the service of the government that they were enabled to obtain what they required at much reduced prices. It was simply a question of supply and demand.

OUTSIDE ROUTE FROM NEW YORK TO PHILADELPHIA, PA.

The first outside line of steam vessels from New York to Philadelphia, Pa., were the "Ocean" and the "Ashland," built by the Harlan & Hollingsworth Co., in 1844, two iron-hull propellers, 98'x23'x9'4, fitted with twin-screws and "Grasshopper" engines, for Geo. W. Aspinwall, of Philadelphia, Pa. These vessels were similar to the early iron-hull propellers built for the Delaware and Raritan Canal. They made but a few trips by the outside route, an agreement having been made with the Delaware and Raritan Canal Co., or the Camden and Amboy R. R. Co., the controlling factor in transportation between New York and Philadelphia at that period. They then run through the canal to Albany and Troy, N. Y., and were subsequently purchased by the government during the Mexican war for service in the Gulf.

The next attempt to open a line on the outside route was made by the steamboat "John Marshall," in 1847, but the business could not have proved profitable, as but a few trips were made by the vessel. The "John Marshall" was 200 feet long, built in Baltimore, Md., and had a beam engine of 50

“PENOBSCOT.”



mches by 11 feet stroke. She was for many years at a later date on the coast of Maine.

The only successful passenger and freight line on the route was that established in 1850, and known as "Sanford's Independent line." For a short time at first they had the "William J. Pease," then the "Kennebec" and the "Penobscot," from the coast of Maine, were on the route, and a short time after the "Boston" and the "Delaware" were added," and subsequently the "Memenon Sanford." The "Cosmopolitan" was built for this line in 1861, but saw little if any service there, as the vessel was taken into the employ of the government just after completion as a transport. The proceeds from her charter, that lasted for about fifteen months, was over four hundred thousand dollars. She was afterwards in the merchant service in the Gulf of Mexico, and some years ago was brought to New York waters and has been mainly engaged in the excursion business. She is now known as the "Edmund Butler," x "Paul Koch," x "Havana." These vessels were of nearly the same dimensions, from 215 to 240 feet long by 27 feet by 10 feet deep, and fitted with beam engines of 40 inches cylinders to 44 inches cylinders, with the exception of the "Cosmopolitan," that had a 50-inch cylinder, all with a 11 feet stroke. They were heavy-built vessels for their size, and were fitted with sponsons under the guards fore and aft of the water wheels. They also had two masts and sails, similar to the coast of Maine steamers. The line did a large freight business, but the passenger travel was comparatively small by this line. Passenger fare from New York to Cape May and Philadelphia was two dollars. The "Boston" was in the transport service at \$600 per day for 18 months; the "Kennebec" for over three years, at \$300 per day. The "Delaware" was lost while in the transport service on May 24th, 1865, just inside St. Johns bar, on the coast of Florida, during a heavy gale. Her hog frames being badly broken and the hull seriously strained, so she became almost a total loss. Most of the machinery and furniture was saved. She was purchased by the War Department, April 13th, 1863, for one hundred thousand dollars, and the remains of the hull sold, in June, 1866, for one hundred and five dollars. She was on a trip from Hilton Head at the time of her loss. The "Boston" was

lost May 25th, 1864, in one of the small rivers around Hilton Head, South Carolina, while carrying troops on a reconnoitering expedition. The vessel went aground, and it being impossible to free her, she was set on fire by the United States troops to prevent her falling into the hands of the Confederates. The "Kennebec" was destroyed by fire April 9th, 1870, while lying at Gloucester Point, Va., and the "Penobscot" was lost off the capes of the Delaware in a heavy gale September 12th, 1857. This was the same storm in which the "Central America," x "George Law," was lost while on the way north from the Gulf of Mexico. Prior to the "Penobscot" being lost her name had been changed to "Norfolk."

In 1866, there were four side-wheel boats of 253'x40'x15' built by Jeremiah Simonson at New York, that were contracted for by Capt. Wm. P. Williams, in the interest, it was generally credited at the time, of one of the large owners of steam vessels at New York City, and intended for the outside line to Philadelphia, Pa. This route they never covered, for they were laid up before the completion of the joiner work at Brooklyn for several months, when they were sold. Their names were "Grampus," subsequently the "Stonington," of the Stonington S. S. Co.; "Manatus," subsequently the "Naragansett," of the same line; and the "Walrus" and the "Nautilus." The engines for the "Grampus" and the "Nautilus" were built by Fletcher Harrison & Co., while those for the "Manatus" and the "Walrus" were constructed by Delamater Iron Works, from the same patterns as used by Fletcher Harrison & Co., in building the engines for the two former vessels, that the engines should all be exactly alike. They were originally 62-inch cylinder by 12 feet stroke, but the two Stonington-line boats' engines were enlarged, about 1872, to 72"x12'. The New York and Philadelphia Steamboat Co. sold the two boats to the Stonington Company in August, 1867, and the "Nautilus" and the "Walrus" were sent, in the latter part of 1868, by J. M. Forbes & Co., of Boston, Mass., to China, where they run for about seven years, when their timbers showed such evidence of weakness from rot that the engine of the "Nautilus" was removed and sent to England, where another hull was constructed of iron, having a corrugated-shaped bottom, to ensure light draft, and

the beam engine erected in the iron hull, but the vessel was lost a few days after leaving for China in a heavy storm on the British coast. The "Walrus" did not last much longer than the "Nautilus."

These vessels that were sent to China waters were the last of a large fleet of American-built steamers that had been constructed for that part of the world, with their exception, and at a time when the people of the outside world were very much excluded from the Celestial Empire. There were two very small iron-hull steamboats sent to China from this country in the early '40s, but these are not included at present. The first of these former vessels was the "Confucius," built in 1853, by Thomas Collyer, of 500 tons, and fitted with a beam engine by H. R. Dunham & Co., of 50"x10', for Russel & Co., of New York. Her time from New York to Singapore was 140 days. This vessel was subsequently purchased by the Chinese government. The next steamer for China appears to have been built by Samuel Sneed, for A. A. Low & Bro., in 1854, and named, when the keel was laid, "Yankee," but sailed under the name of "River Bird." This vessel was 185'x30'x12', with a beam engine by Pease & Murphy, or Fulton Iron Works, of 40"x10'. It will be noticed this vessel had more beam than Thomas Collyer's vessels for the same service. The "River Bird" was intended for the trade from Hong-Kong to Canton. She sailed on February 5th, 1855, and made the Cape Verde Islands in 20 days. The same owners sent out a vessel in sections at a later date that was re-erected in China.

In 1855, R. B. Forbes, of Boston, had built for China parties a propeller named "Antelope," of 155'x27'x10', with a pair of engines 30'x26", constructed by Otis Tufts, of Boston, Mass. The vessel left this country in July, 1855. There was one of the Forbes family at this time that was United States Consul at one of the China ports.

In 1857, Thomas Collyer built another vessel for Russell & Co., the "Yang-Tsze," being 204 feet long, with a pair of oscillating engines, that proved a very serviceable vessel for many years in Chinese waters, and of considerable speed. She was employed in the opium trade.

More ports of China were opened to foreign trade in 1858, and American interests in the Far East had several vessels built for the local China business. Most of these early river steamboats were used to bring down the river from the interior to the warehouses at the treaty ports the products that were shipped by sailing vessels to the United States. It was at this time there was such a rivalry between the American and English steamers in the same trade. This resulted in the success of the American steamers, they being larger carriers and more serviceable vessels, with a smaller consumption of fuel for power.

Thomas Collyer built another for the same quarter of the globe, in 1859, named "White Cloud." This vessel was but 179 feet long, and driven by a beam engine 44"x10'. She made the run from New York to Hong-Kong in 94 days, including stops, leaving the former city March 2d, 1859. During the same year he also constructed for P. S. Forbes, of Russel & Co., the "Pei-Ho," being about 20 feet longer than the "Yang-Tsze," but with a single oscillating engine. The next year he built the "Fire Dart," and the "Hankow," about the same size as those larger vessels built before.

China had for several years been torn by internal wars, and to protect their interests in that Empire, and probably to watch one another, the representative foreign nations had to have a naval force on the spot. This led, in a way, to a treaty, in 1863, with one of the Powers, that threw open the coasting trade of the Empire to foreign nations. Then there was a hustling of the maritime nations to secure the cream of the business.

For a few years there had been no steamers sent to China waters, as American shipping interests had at that time all they wanted to attend to at home. But in 1863 the "Po-Yung" was built by Roosevelt & Joyce, and by Henry Steers the "Hu-Quang," the largest vessel sent to China up to that time, being 270 feet long, with a beam engine of 76"x12'. He also built the "Foh-Kien," that was still larger, and having an engine from the "St. Lawrence," on Lake Erie, that was fitted with Sickel's cut-off, Dickenson's valve gear for high steam and short cuff-off, and patented radial wheels, before

being sent to the East. This vessel made the run from New York to Singapore in 59 days and 21 hours. Lawrence & Foulks built in the same year the "Kiang-Tsze," a beam-engine boat of 200 feet long, and the same year John Englis & Son the "Mo-Yune" and the "Fire Cracker," each of about 250 feet long. The latter made the voyage from New York to Singapore in 52½ days. Henry Steers built the same year the "Che-Kiang," of 260 feet long. This vessel was destroyed by fire at Hankow in August, 1865. In 1864, the "Fire Queen," of 322 feet long, the largest of them all, was built by John Englis & Son, and fitted with a beam engine from the "Western World." Westervelt & Son built the "Foong-Shuey," afterwards named "Plymouth Rock," of 287 feet in length, with an engine from the Lake-Erie steamer "Plymouth Rock." This vessel made the voyage from New York to Singapore in 51 days. The last that was built especially for that service was the "Suwo-Nada," in 1864, by John Englis & Son, of the type of our coastwise side-wheelers at that period. She was under charter for about four months in the early part of 1865 as a transport by C. P. James, at \$810 per day, and subsequently run to New Orleans for a time, and in the latter part of the year was sent to China. Most all of these vessels were like our Long Island Sound steamboats, with their guards running fore and aft of the water wheels, and some with sponsons under their guards, their forward main deck enclosed, but with the exception that they were fitted with masts and sails. The earlier ones sent out were like in external appearance to the "Escort," or the "W. W. Coit." The later ones were of larger dimensions, like those on the coast of Maine. They certainly were remarkably fortunate with vessels of that type, that in a voyage of 15,000 miles none of those mentioned were lost or very seriously disabled on the voyage. These vessels, in going out, stopped at Cape Verde Islands, Capetown at Cape of Good Hope, Mauritius Island and Singapore. Some of those built during the Civil War stopped on their voyage at Halifax, Nova Scotia, took out British papers and sailed under the British flag, to be secure against capture by the Confederate cruisers that were prowling over the course these vessels would take on their way to China.

There was a propeller built by Sylvanus Smith, of Boston, Mass. in 1863, for R. B. Forbes, named "Nippon," of 154 feet long, that was intended for the China trade, but in May of that year the Navy Department purchased the vessel for the blockade service, at a cost of \$75,000. She was of composite construction, and bilge keels, or "outside keelsons," $6\frac{1}{2}$ "x10" and 60 feet long, were fitted on the outside of the hull.

For other propellers for China waters see Poughkeepsie—Hudson River.

It has been generally considered a great risk was taken with these vessels, especially those built in the early stages, for a voyage of near 15,000 miles, exposed to the heavy weather likely to be encountered around Cape Good Hope and in the East Indies. But they had been anticipated by the owners of our river steamboats. After the gold excitement of California broke out, in 1848, sail vessels and steam vessels of all kinds and classes were brought into service for passenger and freight transportation to the Pacific Ocean, and the light-built river steamboat entered the list. Among those that took the risk in the early period was the "Governor Dana," a stern-wheeler of 130 feet by 18 feet, from Oldtown, Maine, that arrived on the Pacific side; the "New World," a beam-engine boat of 216 feet by 27 feet by 10 feet, from the builders' hands at New York City; the "Antelope," that had run for a year or two from New York to New Brunswick, N. J.; the "Senator," that had been on the coast of Maine, and was better fitted for the voyage than any of the others named; the "Wilson G. Hunt," a small river boat that had run to Coney Island, of 165 feet long, left New York March 3d, 1850, on the 9th encountered a gale and narrowly escaped foundering, losing her foremast, and her entire upper works being almost wholly wrecked by the storm. Put into St. George's, Bermuda Islands, for repairs, but afterwards proceeded on her voyage. The "Rhode Island," that had run on Long Island Sound, left New York on January 25th, 1850, and on the 29th encountered a violent gale, and foundered, with the loss of several lives. The "W. J. Pease," that was the pioneer of the Sanford outside line, also started; the "General Warren" and the "Com. Preble," that had been on the Boston and Portland line; the propeller "Eudora," that had been on Long Island Sound,

and two New York tugboats, the "Goliah" and the "D. C. Pell." While two or three of these had been on short coast-wise routes, they were not fitted for such a voyage more than the river boats. The record shows that the "W. J. Pease" was three months in getting well toward the Cape when compelled to return to Montevideo in distress, in June, 1850, where the vessel was repaired and placed in service to Buenos Ayres, but was afterwards sold to run on the Uruguay River. The "New World" made the voyage in 152 days, which was remarkable time for that type of vessel. There was a mate to her, named the "New York," that started a few months later, and consumed about four months in getting to Rio Janeiro, and there all trace of her is lost. The "Eudora" was like many more at the time on the voyages, received serious damage during storms, and at one time was condemned, but from the time of leaving New York to arrival at San Francisco she was 12 months and 11 days. The "Wilson G. Hunt" appears to have been most unfortunate by detentions, for she was laid up at Montevideo for near three months for a crew, and at other ports for repairs, and the time from port to port was 322 days. The "Goliah" was 279 days on the voyage, after many trials. The "General Warren" and the "Com. Preble" were each on the voyage about 9 months. There were several more of these small steam vessels from many Atlantic ports, all of them unsuitable for such a voyage as was undertaken, that started at the time for the Pacific Ocean, but never reached there, being either wrecked or condemned by a board of survey en route or foundered at sea. Those that were so fortunate as to arrive at their destination were compelled to call at every principal port on the way for repairs to the hull of the vessel, or were detained by illness of the crew by fever, or both. Very few instances are recorded of the machinery being disabled. The crews of the vessels that went to China a few years later had an excursion on the voyage when compared to those that went to California in the early days of the California gold excitement. The distance between New York and San Francisco and New York and Hong-Kong, via Cape of Good Hope, is but a few hundred miles in favor of the latter voyage. The Suez Canal was not opened for public use until November, 1869.

It is probable, in some of the California-bound steamers, that enclosing the forward main deck in some form was resorted to for protection during heavy weather, prior to its use on the northern lakes.

The expenses for repairs and laying over at the many ports on the voyage to San Francisco of these light-built vessels was so great, including the wages and expenses of the crew, and insurance where it was obtained, that it deterred many from sending any more of the same class of vessels in the same manner, for we find in the next year, there were three or more good-size river steamboats built at New York that were taken apart and shipped, with their machinery, to San Francisco, where they were re-erected and completed for duty in that far-off State.

In October, 1864, the Coastwise S. S. Co. placed the propellers "E. C. Knight" and the "John Gibson" on the outside line to New York, where they remained for about two years. In 1867, Lorillard's freight line was established by the outside route, and run for several years, but it subsequently came under the control of the Clyde interests, who have controlled the line ever since.



CHAPTER IX.

STEAM FERRY-BOATS AND COMPANIES.



BEFORE the introduction of steam ferry-boats, the rivers at New York City were crossed by boats for horses, baggage, etc., and barges for passengers. In 1810, there were propositions before the Legislature for improvements in the ferries, which required the owners of ferry-boats to have their names painted with white letters on the stern of the boat, and the words "Ferry Boat," on the inside of the stern. It was furthermore proposed that the owners of ferry-boats should at all times in the months of May, June, July, August and September, have their boats ready for passage from half an hour before sunrise until 9 o'clock in the evening, and in all other months from sunrise until 8 o'clock in the evening; and that no passenger should be detained more than five minutes. It was proposed that a sufficient number of barges for passengers should be kept at all of the ferries, upon which barges no baggage or lumber should be carried. Four men were to be employed to row every barge, and in every horse boat two men. The passenger barges should be not less than 22 feet long and 7 feet wide, and no more than fourteen passengers should be ferried in them at one time.

From this may be judged the condition of the ferries, immediately previous to the introduction of steam ferry-boats. The success of Fulton, in the year 1807, in running a steam-boat to Albany and back, aroused the inventive and speculating spirit of the New Yorkers, and the particular application of this new method of navigation to crossing ferries was immediately seen.

The ferry which was first opened to competition at about that period, was that to Paulus Hook, the lease of which expired in the spring of 1811. An association was formed in which Elisha Boudinot, of Newark, N. J., and Robert Fulton were concerned, who made application, in July, 1809, for a

lease of this ferry. A competitor arose in the person of Daniel French, who had obtained a patent for an improvement in the use of steam in propelling boats, by which he claimed a great saving of expense was made. Other competitors came forward in the persons of Elisha Morrell and Levi Kendall, who claimed that they had a patent for an invention which they believed superior in the working of machinery to all others. All these applications were laid over until their respective claims could be more fully examined.

In December of the same year, John Stevens, who owned the shore line at Hoboken and the ferry running to that place, claimed that he had been for some time engaged in costly experiments to apply the force of steam to navigation, and therefore claimed the prior right of steam ferriage to Hoboken.

Daniel French's boat was completed in the course of the winter of 1809-10, and was first exhibited to the public on February 27th, 1810. He was not successful, however, in his application for a ferry lease, and finally, on March 25th, 1811, leases were executed to the Jersey Association for the Paulus Hook ferry, and to John Stevens for the Hoboken ferry, both to be served by steam ferry-boats. It now became a matter of competition between these rival lessees, represented by Fulton on one side, and Stevens on the other, who should first bring a steam ferry-boat into actual operation. In this Stevens was successful. In the early part of October, 1811, he invited the New York City authorities on board the first regular steam ferry-boat which plied in any part of the world. The trip to Hoboken was successfully accomplished, and a formal entry of the fact was made in the city records of New York at the time. While Stevens had the first ferry-boat, Fulton had a more complete ferry system to start with.

The Jersey Association were by their agreement to complete two boats, but were delayed for nearly a year subsequent to the period at which Stevens' boat was put on his ferry. It appears that Fulton was meantime devising improvements, and asked time on the second boat until experiments were made with the first. The first boat was put in operation in July, 1812, on which occasion an entertainment was given at the tavern on Paulus Hook to the members of the Common Council and several other guests.

This ferry is thus spoken of in one of the journals of that period:

"The perfect success of Livingston and Fulton in their invention and establishment of steamboats for the accommodation of passengers between the cities of New York and Albany drew the attention of Mr. Durand, Judge Boudinot, General Cummings and some other gentlemen residing in Newark, to the possibility of improving the communication between New York and Jersey City, by means of steam ferry-boats. In the autumn of 1809, a company of gentlemen subscribed fifty thousand dollars to carry the plan into effect. Negotiations were commenced with the Corporation of New York and the proprietors of Jersey City, for a lease of the ferries for nineteen years, and Mr. Fulton was applied to to construct such a boat as in his judgment would, under all circumstances, answer the best purpose for carrying passengers, coaches, horses, wagons, cattle, etc., etc. Acting for a liberal company and unrestrained in his plans or expenses, the inhabitants of this city have seen, with the greatest pleasure, his complete success. The steam ferry-boat approaches nearer to the conveniences arising from a bridge than anything which art has yet produced; and for this passage of the Hudson River, where a bridge would interrupt or destroy an important navigation, the boat is superior to a bridge.

"During five or six weeks in the severity of winter, the ice may render the passage difficult, but it is evident that among floating cakes of ice this boat can act better than any other; by reversing the motion of her water wheel she can move either end foremost, and not depending on the wind, but on her engine, she can be worked through the openings in the ice in every direction.

"The width of the river is from one and a quarter to one and a half miles, the depth of water on an average fifty feet. In such a situation, a permanent bridge with stone piers, could not be built for less than two millions of dollars, whereas the present establishment when finished, consisting of two steam ferry-boats, with the wharves and floating bridges for entering the boats, will not exceed fifty thousand dollars. Such economy is sufficient inducement to establish steam ferry-boats in a variety of places in the United States, where expense will

prevent the building of bridges; and we hope soon to see a similar establishment on the East River between New York and Long Island."

The system was so thoroughly worked out in the beginning that Fulton's own account of his design will stand fairly well for a description of the ferries of a later day, and the following letter, written by him to Dr. David Hosack, describing the boat, etc., which he had put in operation, in 1812, upon the Paulus Hook ferry, will doubtless prove of interest.

"Sir: At your request, I have sent you a bird's-eye and side view of the Paulus Hook steam ferry-boat and floating bridge, by which everything enters or is landed from her.

"My reasons for her particular form and arrangement of machinery are as follows:

"First. She is built of two boats, each 10 feet beam, 80 feet long and 5 feet deep in the hold, which boats are distant from each other 10 feet, confined with strong transverse beams, knees and diagonal braces, forming a deck 30 feet wide and 80 feet long. To give her more strength, she is held together by four-inch braces, each two inches square, which pass through her one foot above the water line, and key on strong plates on the inside of each boat. Reflecting on a steam ferry for Hudson River, the waves usually running up or down, I found a great breadth of beam absolutely necessary to prevent the boat rolling in the trough of the sea. This is attained by two boats and one space, giving 30 feet beam.

Second. By placing the propelling water wheel between the boats, it is guarded from injury by ice or shocks on approaching the wharf or entering the docks, which operation being performed twenty-four times in the twelve hours, allows no time for fending off with boat hooks.

"To give despatch and convenience, it is necessary the boat should arrive at the bridge without the possibility of any injury; hence all important parts of the machinery should be carefully guarded, particularly the propelling wheel.

“Third. The whole of the machinery being placed between two boats, on the beams over the open space, leaves 10 feet wide on one side on the deck of the boat for carriages, horses, cattle, etc., the other having neat benches and covered with an awning, is for passengers. On the latter side there is a passage and stairs to a neat cabin, which is 50 feet long and 5 feet clear from the floor to the beams, and furnished with benches for passengers in rainy or bad weather. In the winter there will be a stove in this cabin, which will add much to the comfort of the passengers while navigating through the ice.

“Fourth. Although the two boats and space between them give 30 feet beam and proportionate stability, yet they present sharp bows to the water, and have only the resistance in water of one boat of 20 feet beam, which diminution of resistance gives speed in crossing.

“Fifth. The space from stem to stern is 20 feet wide, which gives ample room at each end for carriages or persons to enter or go out of the boat.

“Sixth. Both ends being alike, and each having a rudder, she never puts about. At New York the horses and carriages enter at one end of the boat, the horses heads towards Jersey. On arriving, they go out at the other end, without changing the line of direction; in like manner, when coming from Jersey to New York. Thus the shortest possible and quickest movement of all that is to pass is made to save time and secure convenience. Her rudders are equipollent—the iron shaft which serves as a rudder-post standing in the middle of each, by which construction the pressure of the water being equal on each side of the centre, it can go either end foremost. With yokes and parallel bars, the movements of the rudders are carried to the helms, the only position where the helmsman can have a full view of all around the boat, and see how to steer her into the dock.

“It was at one time my intention to put a rudder on the bow of each boat, and work them by a connecting bar, but considering that such rudders, while acting as a bow, would be injured by ice or destroyed by shocks against a

wharf or timbers, and knowing that the greatest current of water is exactly behind the wheel and between the two boats, I place them as delineated, where they answer every desired purpose, and are guarded from injury. In my first sketches, I had made the inside line of each boat straight, that the water might have a free passage from one end to the other; but the disadvantage of such a mode of construction would be, that the whole of the inside lines would act as leeboards, rendering it difficult to put her about, or to work her up in the tide. Had this boat been moved by wind, such a form, to prevent leeway, would have been advantageous, but moved by steam, the less water she draws, the easier she moves over it in every direction the better; her bottoms are therefore made rounding, with very little dead rise. Another material error which would have arisen from straight insides would be that each bearing but half a boat, the two could not give more breadth of beam, or so much buoyancy as one of the present boats, and to give the 30-foot beam it would be necessary to have a vacant space between the two insides of 20 feet, which long and hollow bearing would produce weakness. Such a boat, to carry the same weight, would draw near twice as much water as the present steamboats, and create a resistance in the water equal to the present resistance by breadth of beam.

“Seventh. The floating bridges, of which there is one on each side of the river.

“A coffer, 24 feet long, 12 feet wide and four feet deep, which gives a superficies of two hundred and eighty-eight feet, or nine tons weight to press it in the water one foot, or one thousand five hundred pounds to press it in the water one inch. This great resistance gives stability, while carriages or heavy wagons enter the boat. The bridge is thirty feet long, twenty wide, fastened by four strong hinges to the coffer and to the wharf; thus the bridge rises and falls with the tide, and is always exactly even with the end of the boat. When low water there is an easy descent into the boat; at half flood, the boat, bridge and wharf are on a level; at high water there is an easy descent from the boat to the wharf. As the weight of the bridge

is on one edge of the coffer, to prevent its sinking on that side, and rising on the other, a chain is fastened to the bridge, which passes over a pulley, with a heavy weight. Such an application on each side of the bridge pulls it up in the middle, and pushes down the coffer, added to which, a pine log, one foot square, is bolted on each side of the coffer, with two transverse logs dovetailed into them, of which the weight and leverage retain the coffer in a horizontal position. The next and last thing to be discovered was how to make the boat arrive at the bridge without the aid of boat hooks, or any pushing or pulling or loss of time or shock, the latter being the most material to guard against; for this purpose the dock which receives her is one hundred and eighty feet long, seventy wide; the bridge is fastened to the middle of the bulkhead. The boat being only thirty feet wide, and the dock seventy, leaves twenty feet vacant on each of her sides; in these twenty feet spaces, and on the water there are floating stages made of pine logs, which lie parallel to the boat for thirty feet, and then run diagonally to the extreme end of the wharves, so that the boat, when coming in, hits within the seventy feet, and the stages guide her direct to the bridge. To prevent shocks, there are two pieces of timber, each eight inches square, which move on rollers, and run out between the bridge and coffer; the two are connected by a crossbar, and under the bridge by another crossbar. To this latter crossbar, and on each side of the bridge, there are ropes fastened, which ropes pass under pulleys, descend and fasten to buckets, which buckets of oak, strongly hooped with iron, are fifteen inches in diameter, six feet long, and when full of water will weigh about one thousand eight hundred pounds.

“When the fenders are projected to their position, which is about ten feet from the bridge, the buckets are down in the water, leaving their upper rim about three inches above the surface. Each bucket has four holes in the bottom, of an inch diameter, by which the water enters as they descend, and which lets out the water as they rise. In case the resistance should be too great for the boat to

come close to the bridge, the water running out of the buckets will diminish it and let the boat arrive at the position required. To prevent shock, the whole force must be gradually diminished to annihilation; the resistance to the boat must be little in the commencement and increase until the whole power is destroyed. Fortunately, this contrivance produces the desired effect. When the buckets are in the water, they are nearly buoyant, but the moment the boat strikes the crossbar, and it begins to run in, the buckets come gradually out of the water and grow heavier each inch they rise, increasing resistance until the momentum is destroyed and the boat arrives at the bridge without shock, when the passengers, carriages and horses immediately move out and others enter.

"In the present state of this part of the machinery, to prevent shocks, it is necessary the men should be attentive to stop the engine in time. The most perfect machinery is that which leaves as little as possible to the care of man.

"I have some additions to make which will prevent the possibility of shocks, even in cases where men may mistake or be careless. In a new combination of this kind, it is not to be expected that everything should work to the best advantage in a first experiment, or that every requisite should be foreseen. The boat which I am now constructing will have some important improvements, particularly in the power of the engine to overcome strong ebb tides, from which again other improvements will be made, as in all other inventions. The present boat crosses the river in a calm in fourteen minutes; her average time is twenty minutes. She has had in her at one time eight four-wheel carriages, twenty-nine horses and one hundred persons, and could have taken three hundred persons more. From the success of this experiment there is the pleasing prospect that boats of this kind will facilitate the passage of many of our wide rivers and bays, and prove an important benefit to our country. I am, Sir, respectfully,

"Your most obedient,

"ROBERT FULTON."

There have been several changes made in late years from Fulton's design, although some features have been retained. There has been, to be sure, a very material increase in size of the vessels, and a very wide departure in their passenger accommodations. The double hulls were finally dispensed with about 1836, and single hulls substituted since. The docks or slips have been enclosed with spring piles and racks, and the balanced beam for landing bridges has long since given way to floating bridges; india rubber springs at the hinge of the floating bridges were afterwards used, while the boats are now slowed down in entering the slips.

The following is the copy of an estimate made by Robert Fulton for running a ferry-boat prior to the opening of the Jersey City ferry.

*Estimate for the expense of a steam ferry-boat for one year:

2 Firemen, at \$30 per month each, they finding themselves; they will also act as engineers to keep the engine in order; they must be engaged by the year, as such men cannot be turned away in the winter and got in the spring, \$60 per month	\$720.00
2 Boatmen to take turns in steering, at \$25 a month each, \$50 a month.....	600.00
11½ Cords of wood, for 12 or 13 hours, at \$4.50 per cord or, say, 7 dollars a day; to work 320 days	2,240.00
Wear, tear and repairs.....	600.00
	<hr/>
	\$4,160.00

January 22d, 1810.

ROBERT FULTON.

The Paulus Hook ferry company was incorporated by the New York Legislature in March, 1814, as the York and Jersey Steamboat Ferry Co. The first boat built for the company was named the "Jersey," and was in service for many years. The second built, and of the same model as the "Jersey," was

* The original of this estimate was at one time in the possession of Cobanks & Theall, marine-engine builders, New York.

constructed in 1813, and named the "York." It is said these boats were slow coaches—that when they passed close to one another in the river passengers on the two boats could hold quite a lengthy conversation before they got beyond talking distance. Up to May, 1816, the lessees had made but one dividend of 5 per cent. For this reason they requested that the Common Council of New York would either purchase the ferry, reduce the rent, or increase the rates of ferriage. The only relief obtained was an increase of personal toll to 12½ cents. In those days the fare was collected on the boat during the passage over. On the first of May, 1823, the company took a lease of the right of ferry from New York to so much of the Jersey shore as lies between a point immediately south of Hoboken and a point due west from the Battery. But their experience was not a success. They sank all their capital, the boiler of one of their boats blew up while in the slip, and the year 1824 found them unable to continue. In September, 1825, they assigned their lease to Francis B. Ogden, Cadwallader D. Colden and Samuel Swartwout. The Common Council of New York City consented to the assignment and gave the assignees a new lease for fifteen years and six months from the first of November, 1825. The lessees were to provide two good steamboats, but in the place of one of these were afterwards permitted to use a team or horseboat. They were also to provide the ferry with rowboats. In 1826 they bought and placed on the ferry the "Washington." In October of same year, Ogden and Swartwout transferred their interests in the lease to Colden. He failed after a time in making the operation of the ferry a successful enterprise, and surrendered it to the York and Jersey S. B. Ferry Co. On the first of January, 1836, the owners leased it to the New Jersey R. R. Co., running to New Brunswick, N. J., for a term of years, having in the meantime built three new boats, the "Essex," "Sussex" and "New Jersey." By renewals the railroad company continued to operate the ferry until 1853, when the lessees bought up the stock of the ferry company, and thus became the owners of the ferry. They continued to operate the ferry until the N. J. R. R. and Trans. Co. was absorbed by the Pennsylvania R. R. Co., when the ferries passed to the same hands.

The ferry from Desbrosses street to Jersey City was opened in 1862. The Pennsylvania R. R. Company took these ferries in 1871.

X The Hoboken ferry was first opened with sailboats and rowboats in 1775, and was run with varying success by several owners until after the close of the Revolutionary War. X John Stevens first came into possession of the lease of this ferry to Vesey street, New York—now Barclay street ferry—in 1789, but retained it only for about two years. It is as well to say that Colonel Stevens purchased the Hoboken estate in July, 1784. The lease of the ferry then passed to other hands, and in 1808, David Goodwin secured the lease of the ferry, and in 1811 John Stevens was the proprietor. He now built a steam ferry-boat, named the "Juliana," and this David Goodwin appears for a time to have had the control of the vessel while running on the ferry, though the lease was to John Stevens. On September 18th, 1811, he advertises:

"Hoboken Steamboat.

"Mr. Goodwin respectfully acquaints the citizens of New York and the public at large, that he has commenced running a steamboat on the Hoboken ferry of large and convenient size, and capable of affording accommodations in a very extensive degree. The boat moves with uncommon speed and facility, and starts from the usual ferry stairs at the Corporation wharf, foot of Vesey street, New York, where passages can be taken at any hour."

A news item at that time said: "Steamboats are rapidly getting into the full tide of successful experiment in this country. Last week one of Col. Stevens' ferry-boats, employed by Mr. Goodwin, of Hoboken, was started into operation, and yesterday made 16 trips back and forth between that place and this city, with a probable average of 100 passengers each trip. Her machinery, we understand, is somewhat different from that of the large North River boats, and we presume she sails considerably faster than any other heretofore constructed in our waters."

A committee from the members of the New York City Common Council were invited to take a trip on this, the first steam ferry-boat in the world, as the minutes of that body for

October, 7th, 1811, say: "A note was read from Mr. John Stevens informing the Common Council that he should expect the members on Wednesday next, at 10 o'clock, to witness the operation of his steamboat. Whereupon, resolved, that the Board will attend at that time." The minutes further say, on October 14th, 1811, "A report of several members who, on the invitation of John Stevens, Esq., crossed the river in the Hoboken steam ferry-boat, expressing their approbation of the same was received and ordered to be filed."

The "Juliana" was continued in service on the ferry for a little over a year, and it is altogether probable the vessel was withdrawn more on account of the opposition of the Paulus Hook Ferry Company to a steamboat on the route than anything else. Her highest speed under the best conditions was $5\frac{1}{3}$ miles per hour. After she was withdrawn she was taken out a few times, and gave the Albany boats "a brush" for a few miles on the river, probably after some changes had been made. The Paulus Hook ferry being owned partly by those in the North River Steamboat Company, and they holding the exclusive privilege for steam vessels in New York waters, were in a position to deny Stevens the right to employ a steamboat on the Hoboken ferry to New York City. This was what caused the adoption of the teamboats in 1814. Teamboats were also brought into use by the demands of Robert Fulton for the use of his patents on steamboats, of one half of the dividends of all over 10 per cent. received by those making use of them. Teamboats were the invention of Moses Rodgers, of New York, and were first brought into use on the East River in 1814. This one on the Hoboken ferry was the second in use.

John Stevens continued to operate both the Vesey street as well as the Spring street ferry until June, 1817, when he sold to John, Robert and Samuel Swartwout the exclusive right of ferriage from Hoboken to New York. The Swartwouts proposed to have on the two ferries by the first of May, 1818, "two horseboats and other craft for the accommodation of the public." On the 7th of April, 1817, the Common Council consented to the transfer of the ferry leases, and an extension thereof for ten years, on condition that the Swartwouts would give to the city \$516.25 a year for the Vesey street ferry, and within six months from the first of the following May place

thereon two good horseboats of not less than eight horses to a boat," and for the Spring street ferry to give \$25 a year, and place thereon "as many sail or ferry-boats as the Corporation may deem proper." About this time the landing on the New York side was changed to Murray street. But that location was found to be too "remote from the Market to accommodate the country people," and as Vesey street was "too much covered with carts, etc.," Barclay street was selected as the landing place on the 8th of June, 1818. At this place it has remained ever since. The Swartwouts held these ferries but a little over one year. They assigned them to Phillip Hone, of New York. The Common Council consented to the transfer. They gave him a lease for twelve years, and permitted him to "substitute a good, substantial teamboat in the place of a steamboat." About the first of March, 1821, an ejectment suit was begun against Hone to take from him the ferry. Before this suit came to trial the parties compromised, and the two ferries reverted to the Stevens family. In May, 1821, John C. and Robert L. Stevens purchased the interest which Hone had in them. They now proposed to place on the Barclay street ferry "a superior steamboat, from ninety to one hundred feet on deck and forty-two feet beam, built of the best cedar and oak," and promised to put on more than one if necessary. For the Spring street ferry they promised an eight-horse teamboat. The Common Council consented that John C. Stevens should have the lease of the Barclay street ferry for nine years from May 1st, 1821, at a rent of \$595 a year, and that he and his brother, Robert L. Stevens, should have the Spring street ferry for fourteen years, paying therefor, for the first four years, one cent a year, for the next five years \$50 a year, and for the next five years \$200 a year. It was further agreed that the Barclay street lease should be extended for five years at a rent of \$800 a year. *The Hoboken Steamboat Ferry Company* was incorporated November 3d, 1821.

On the 22d of April, 1822, the Messrs. Stevens made a trial trip of the first steamboat placed on the ferry since 1813. This was the "Hoboken." Thereafter it made trips "every hour by St. Paul's Church clock." On the 21st of July, 1823, they received permission to start the Canal street ferry and use steamboats thereon. On the first Friday in September,

1823, the "Pioneer" made its trial trip. In these boats the ladies' cabin was below deck, carpeted, and warmed by open fire places. From 1821 to December, 1896, these ferries were controlled by the Stevens family, and of later years the Hoboken Land and Improvement Company. Since the date last named the ferries have passed into the hands of a syndicate operating the Union and other ferries on the East River.. In 1903, these ferries passed under the control of the Delaware & Lackawanna R. R. Co.

The Christopher street ferry was opened for travel in July, 1836, and the West Fourteenth street ferry on May 1st, 1886.

THE ASSOCIATED FERRIES OF THE UNION FERRY COMPANY.

As early as the 12th of October, 1694, the Corporation of New York purchased from William Morris, for no specific consideration, his house, barn and premises, situated at the "Ferry," on Long Island. On this property the grantees erected a pier and ferry stairs, and enclosed a cattle yard. Subsequently, they built here a brick and stone ferry house. On the New York side of the river the ferry landing was, about 1700, removed from Peck Slip to Fly Market Slip (Maiden lane); and in 1774 the Corporation established another landing at Coenties Slip, as also another on the Brooklyn side, foot of the present Joralemon street. In awarding the ferry lease, in 1789, the persons licensed to run the boats were required to pay into the city treasury, for each two boats from Fly Market Slip, the sum of seven pounds per month; and for the boats from Peck Slip three pounds per month. In the year 1805, five cattle or horseboats (scows with a sail), and six row boats were licensed to run from Fly Market Slip to the Corporation Dock at Brooklyn.

The Catharine ferry was first established in 1795. To distinguish it from the "Old" or Fulton ferry, it was called the "New Ferry," and ran from what was then called "New Ferry street," in Brooklyn, to the foot of Catharine street. This ferry was leased to Rodman Bowne, in 1811, and continued to him and his brother by renewals until 1852, when the ferry was purchased by Cyrus P. Smith and William F. Buckley, who obtained a renewal of the lease for ten years (1853 to 1863).

The rent of the Middle, or "Old" ferry, from foot of the present Fulton street, in Brooklyn, to the Fly Market Slip, was \$3,050 in 1805, but in May, 1811, it was leased to Theodosius Hunt and Losee Van Nostrand, for three years, at a rental of \$3,450 per annum. The same year the "New Ferry" (Catharine street), was leased for five years, at \$1,275 per annum.

Those who in these days pass quickly and comfortably at times over the East River in capacious boats, can scarcely imagine the discomforts, hindrances, and even dangers which accompanied ferry travel in the past, when accomplished only by row boats, flat scows with sprit sails, or, at best, periaguas, or the two-masted sail boats. Ferry business then was very much at the mercy of the tides and wind. At slack water or with a moderate current, the oarsman had an easy time, and the passengers a comfortable and quick trip. But against a rapid flood or angry ebb tide, the boatman could make little or no headway, and the work of ferrying was slow and toilsome. Sometimes a favoring breeze enabled the sailboats to cross without difficulty; and, again, baffled by wind and tide, they brought up near Governor's Island, or as far out of the way in the opposite direction. It may be expected, under the circumstances, that navigation was often stopped temporarily, that delays were common, and accidents frequent. A nuisance peculiar to the ferries, and one much complained of, was the manner of carrying cattle. A large portion of their stock, it will be remembered, was obtained by New York butchers from Long Island. Boats loaded with cattle, if caught by a stiff breeze while crossing, were very liable to be upset. Indeed, so unsafe were they considered, especially when the day was windy or the river obstructed by floating ice, that few persons would venture to trust their horses, carriages, cattle or other property upon them, and it was no uncommon circumstance for such persons to wait a day or two for calm weather, in preference to running the risks of the passage. The oar barges for foot passengers, though more regular in crossing, were by no means comfortable or always safe. The papers of the day abound in notices of accidents, which prove that the dangers of this means of transit were not imaginary. When we consider also the not infrequent unseaworthiness of these crafts, the frequent intoxication of the boatmen, the dilatoriness of

the boats in starting upon their trips, as well as the delays and inconvenience caused by cattle loading, etc., we may realize that some better system of ferriage was much needed.

Relief came—through the success of Robert Fulton's first steamboat, the "Clermont," and the first opportunity for a practical test of the peculiar application of the new motive power to the improvement of ferries, by the establishment of a steam ferry between New York City and Paulus Hook, in 1812, suggested the necessity of extending its use to the East River ferries also.

Robert Fulton and Robert R. Livingston, holding the exclusive right to use steamboats on the waters of New York State, in 1812 offered to the Corporation of the City of New York a proposition to establish a steamboat ferry from Fly Market Slip to Brooklyn. After a number of consultations, agreements, reports, resolutions, etc., the proposition was accepted, and it was decided that the ferry should be from Burling Slip, on the New York side. As, however, the slip was not then filled in, and the cost of filling was estimated at \$30,000, it was finally concluded to establish the ferry at Beekman's Slip (present Fulton street, New York), which was accordingly purchased for that purpose by the Corporation from Mr. Peter Schermerhorn. Beekman Slip at that time only extended to Pearl street, but Fair street, which then extended from Broadway to Cliff street, was extended through the block between Cliff street and Pearl street, to join Beekman Slip, and to this newly extended Fair street from the East River to Broadway, as well as to Partition street, which extended from Broadway to the Hudson River, was given the name of Fulton street, in honor of the distinguished citizen, Robert Fulton. The ferry from Fly Market Slip was discontinued.

The lease of the ferry was granted to Robert Fulton and William Cutting, his brother-in-law, for twenty-five years, from the 1st of May, 1814, to May, 1839, at an annual rent of \$4,000 for the first eighteen years, and \$4,500 for the last seven years. The lessees were bound to put on the ferry one steamboat similar to the Paulus Hook ferry-boat; to run once an hour from each side of the ferry, from half an hour before sunrise to half an hour after sunset; to furnish, in addition, such

barges, etc., as were required by previous acts of the Legislature; and on or before the 1st of May, 1819, they were to provide another steamboat in all respects equal to the first, and when that was done a boat should start from each side of the river every half hour. As a compensation to the lessees for the increase of expense which would be incurred in conducting the ferry upon such a large scale, the Corporation agreed to apply to the Legislature for a modification and increase in the rates of ferriage. The proposed bill passed the Legislature. It included a reduction of fare on all loaded and unloaded vehicles, and a provision for commutation for \$10 per annum for foot passengers. The law of the State regulating ferries between New York and the Island of Nassau, passed in 1813, fixed the rate of foot passengers at *two cents*. The Legislature was induced, in consequence of the expense of running the steamboats, and their cost of construction, to raise the fare to *four cents*. The rate by barges for foot passengers was continued at *two cents*.

Matters being thus satisfactorily arranged, Fulton and Cutting formed a stock company, entitled "The New York and Brooklyn Steamboat Ferry Association," with a capital of \$68,000, in sixty shares, valued at \$1,133.33 each. 70
The first steamboat placed upon the ferry was named the "Nassau," 4
making her first trip May 10th, 1814. The Long Island "Star," of May 18th, 1814, says: "The steamboat "Nassau" crossed the ferry forty times on Sunday last. She is generally from four to eight minutes in crossing. On the day of her commencement she carried at one time 549 passengers, one wagon and two chairs with their horses, and one saddle horse." 4
The vessel was also much employed after business hours by pleasure parties, in moonlight excursions upon the river. The "Nassau" was a double-hull boat, similar to the one at that time on the Jersey City ferry. The hull of this vessel was sold, about 1840, to the Seamen's Friend Society, for a floating bethel at the foot of Pike street, New York. The double-hull was laid aside, or sold for a hay barge, in 1868 or '69, when a new hull and church were constructed.

As early as 1817, the success of the steam ferry-boat had created in the public mind a very general wish for the addition of another boat. The company demurred on the ground of

expense, and stated that teamboats, which had recently been introduced upon Catharine ferry, were not only more easily navigated, but much safer in winter than steamboats. They offered to substitute one in place of the required steamboat, and to run it until eight o'clock in the evenings. This was finally agreed to. The first teamboat on the Catharine ferry made its first trip April 3d, 1814, making twelve during the day, averaging eight to eighteen minutes in crossing, and two hundred passengers each trip. These boats had covered cabins and were in all respects superior to the scows or periaguas which they replaced. Those at first introduced on the ferries were "single enders," that is, they had but one bow and were compelled to turn in crossing the river. Subsequently, "double enders," or boats capable of running "bow on," without turning around, were used. These boats were each made with two hulls, about twenty feet apart, and covered over by one deck. The paddle wheels, turned by a shaft between the two hulls, and this shaft was made to revolve by means of cranks on a small wheel on either side of the shaft, fitting into a large wheel, which, with corresponding cranks, was moved around a circle of 18 or 20 feet diameter by horses, as in a cider mill. By an invention of Mr. John G. Murphy, the direction of the boat was reversed without changing the horses, simply by lowering the end of the shaft on which the paddles were fastened from its lock with the cranks of the large wheel, and raising the other end of the shaft, and locking it with the cranks of the large wheel, an operation performed by means of a lever in less than half a minute.

The winter of 1821-22 was more severe than almost any experienced since that time. The ferries were almost impassable from the quantity of floating ice, through which the ferry-boats could not force their way, as the ice became jammed between the ends of the two hulls.

A new steam ferry-boat, named the "William Cutting," and of similar construction to the "Nassau," was put on the ferry in 1827. The detentions at the ferry, the poor construction of the boats, and the insufficient accommodations furnished, excited great dissatisfaction and animosity, which found expression in public meetings and by complaints in the newspapers.

In 1833, the controlling interest in Fulton ferry having passed into other hands, two new steamboats, one named the "Relief," for passengers and freight, and the other the "Olive Branch," for passengers only, were added to the ferry. Both of these boats had single hulls and side wheels.

The South Ferry was leased from September 1st, 1835, to May, 1839, from Whitehall street to Atlantic street, Brooklyn, for the sum of \$1,000 per year, but was not open for travel until May, 1836. This enterprise was brought into operation through the endeavors of property owners in South Brooklyn, and the incorporators of the Long Island Railroad, which was building at this time, and who desired to run their road down Atlantic street to the ferry. Before the end of the lease, in 1839, its expenses were found to have far exceeded its income, and a large portion of its capital had been used up.

In 1835, the unexpired lease of Fulton ferry was sold, with the boats and fixtures, for \$100,000, and a subscription to a seven per cent. stock was made among a number of citizens of Brooklyn. Notwithstanding prudent management, the assets of the association at the termination of the lease, in 1839, proved the stock to be worth only 68 per cent. of its face value.

In the meantime the incorporators of the South ferry, whose lease terminated in 1839, to prevent the abandonment of their ferry and the loss of the remainder of the capital they had invested in it, applied to the Corporation of New York to unite their ferry with the Fulton ferry in a new lease, which had been applied for. This application met with opposition from some of the stockholders of the Fulton ferry, who hoped by a renewal of their existing lease to recover the capital lost in their present lease. The lease was subsequently granted, uniting the Fulton and the South ferries, for five years, from May, 1839 to 1844; at an annual rent of \$12,000. These lessees organized themselves under articles of association, with a capital of \$183,000, under the name of the New York and Brooklyn Union Ferry Company. The ferriage for foot passengers, which was then four cents, was reduced, on May 5th, 1842, to three cents, and on February 7th, 1844, to two cents. The lease required that no dividends be made exceeding seven per cent. per annum, and that any excess of profits should be applied to the reduction of the rates of ferriage, or paid to

the City of New York. In 1840, the lessees commenced building a new boat, named the "Suffolk," with a single hull, similar to the South Ferry boats, which were found to be good boats to contend with ice. In 1843, they commenced building another boat, the "Union." Commutation, which had always existed on the Fulton ferry, was extended so as to include both ferries. On the settlement, at the termination of the lease in 1844, the stock, by the valuation of the commissioners, was found to be worth only seventy-five cents on the dollar.

The renewal of the lease was applied for by the association in 1844, but they were not successful. On account of the rival bids received, it was decided to receive sealed proposals and to lease to the highest bidders, who were Jacob R. Leroy and Henry E. Pierrepont, the latter having been vice-president in the association. The lease was made for seven years, from 1844 to 1851, for \$30,500 per year, without any restrictions as to the rates of ferriage or dividends. This company was organized under the name of the "Brooklyn Union Ferry Company," with very much the same board of managers as existed in the former board.

The new company proceeded actively in the improvement of the ferry landings, and in replacing the old boats by new ones of greater power, and of enlarged and superior construction.

The lessees of the Union Ferry Company obtained the right to run a boat to Hamilton avenue, Brooklyn, from Whitehall street, at the annual rent of one dollar, which was done in October, 1846. The Atlantic Dock Company guaranteed to pay, as rent, the interest on the value of the boat, and to pay any loss incurred in running the ferry. Besides the rent paid, it was found at the end of the lease, in 1851, that a loss of \$25,000 was made by the Union Ferry Company.

The lease of the Fulton, the South and the Hamilton avenue ferries, which expired in 1851, was renewed to the former lessees at the rent of \$35,000 for ten years. Articles of association between the lessees and the stockholders stipulated that all the surplus at the end of the lease, after paying 8 per cent. dividends, and the stock at par, should be paid over to the Brooklyn City Hospital and Brooklyn Observatory, or to either of them, thus promising the stockholders a fair

return for the risk of their capital, and a guarantee to the public against speculative profit. Two new boats were built; the dusty stoves had been removed and the cabins warmed by steam pipes during the former lease; gas was now introduced in place of oil lamps, and the roofs of the cabins raised, giving better ventilation.

In 1853, the Roosevelt street ferry to Bridge street, Brooklyn, was established by F. C. Havemeyer and S. J. Tilden, and equipped with three good ferry-boats and ferry fixtures, at a cost of \$170,000. In the same year, Jacob Sharpe and associates obtained a lease for ten years of a ferry from Wall street, New York, to Montague street, Brooklyn, supposing the Union Ferry Company would pay a bonus for the lease, but they declined to do so. The lessees furnished the ferry with two first-class ferry-boats, which were run for a few months.

In 1851, the leases of the Catharine street ferry and the Gouverneur street ferry were purchased by C. P. Smith and W. F. Bulkley; but they found in a few months, as did the lessees of the Roosevelt street, and the Wall street ferries, that their receipts for foot passengers being two cents, the ferries could not be maintained in competition with those of the Union Ferry Company, which charged but one cent. The lessees of these four ferries, viz.: Wall street, Catharine street, Roosevelt street and Gouverneur street, then announced that they would be obliged to discontinue their ferries; but in November, 1853, an agreement was completed, after considerable pressure had been brought to bear upon the Union Ferry Company, whereby a consolidation of the four ferries was made with the Union Ferry Company, which was carried into effect on the 6th of December of the same year. The company organized under the General Act of 1854, in that year, as an incorporated company, as the Union Ferry Company of Brooklyn, with a capital of \$800,000. The ferriage for foot passengers was fixed at one cent, on all the seven united ferries, and commutation was continued at the same rates as heretofore. The financial results of the consolidation, however, greatly disappointed its friends. At the end of the first year of the consolidation there was a loss of over \$60,000 of capital, besides the surplus which had been accumulated. It was

thus evident that the ferries could not be sustained at one cent ferriage, and in 1854 it was raised to two cents, but tickets continued to be sold at one and a half cents. This change did not relieve the company from the burden which the consolidation had imposed, all the ferries except the Fulton showing a deficiency in their annual accounts. Accordingly, the company, on November 1st, 1856, advanced the price of tickets to two cents, and abolished commutation. This afforded more relief to the company, but it was not until 1859 that it began to accumulate surplus earnings. The lease of the Gouverneur street ferry expired in 1856, but the company did not renew the lease, although they continued to operate it until January 10th, 1857. The Roosevelt street ferry was discontinued from August 4th, 1859.

The leases of the five ferries, the Fulton, South, Hamilton avenue, Wall street, and Catharine street, were sold at auction in May, 1860, for ten years, from May, 1861, to May, 1871, to the Union Ferry Company for \$103,000 per year, after much spirited bidding. In 1861, they erected new ferry buildings at Hamilton avenue ferry; and in 1863 they built the iron ferry building at Fulton Ferry, on New York side; and in 1864 the iron ferry building, foot of Whitehall street; and in 1871 built the substantial edifice at the foot of Fulton street, Brooklyn.

The propriety of building iron boats was considered by the Directors as early as 1856. They commissioned their associate, H. R. Worthington, and their chief engineer, Henry McFarlan, to visit Boston and examine an iron ferry-boat which was in use there. On receiving their report, the directors, deeming that sufficient time had not elapsed in which to test fully the advantages of iron over wood in the construction of vessels, concluded to adhere for a while at least to the old and long-tried material. Further experience, however, seemed to favor the use of iron, and accordingly, in 1871, the "Fulton" and the "Farragut" were built with watertight compartments. These boats cost about \$77,000 each.

In October, 1861, three of their boats, the "Ellen," the "Whitehall" and the "Wyandank," were purchased by the United States government, and in 1863 the "Atlantic" x "Com. Read", was also taken, all of them being converted into gun-

boats. In 1862, the Navy Department also bought from them four boats, which were then in course of construction, "Ellen," "Whitehall," "Clinton" and "Somerset," two of which, the "Clinton" and the "Somerset," they purchased from the government July 12th, 1865, and rebuilt for service on the ferries. The "Ellen" remained South after the war was closed. The "Whitehall" was destroyed by fire at Old Point, Va., March 10th, 1862, and the "Wyandank" was taken for service at the Naval Academy at Annapolis, Md. The Navy Department paid for the "Atlantic," \$91,000; "Com. Morris," \$42,000, and the "Somerset," \$69,689. The cost of refitting was included in the latter.

Previous to the Brooklyn Bridge project, the company, in order to add facilities at the Fulton ferry, made an additional slip north of the upper ferry slip in Brooklyn, which they had in use but about four years, when the bridge engineers located one of the bridge towers in it, which, of course, cut off its further use.

The renewal of the lease from 1871 to 1881 was made to the company, at a rent of one dollar per annum and taxes, on condition that they reduce the fare for foot passengers between the hours of 5 and 7.30 in the morning and 5 and 7.30 in the evening, to one cent, and during other hours of the day and night to be two cents. This lease was subsequently held to be irregular and invalid, and in March, 1876, the Union Ferry Company was sued for rent, but after a tedious struggle in the courts a compromise and settlement was made, in 1881, by a payment to the city of three hundred thousand dollars on the lease from 1871 to 1881. A new lease was made for the term of five years, from May 1st, 1881, to May 1st, 1886, at a rental of $12\frac{1}{2}$ per cent. of the gross receipts from ferriage at all the five ferries leased to the company. In 1886 a lease for another term of five years, from May 1st, 1886, to May 1st, 1891, was made to the Union Ferry Company, at a rental of $12\frac{3}{4}$ per cent. of the gross receipts.

Since 1896 the Union ferries, with many of the upper East River ferries, have been consolidated under one management.

All of the improvements made on these ferries of late years have been on those running to the lower part of the

city, where large and finely equipped ferry-boats have been in service.

X The following ferries were established previous to 1836, viz.:

From New York:

Fulton Ferry to Brooklyn.
Catharine street ferry to Brooklyn.
Peck Slip ferry to Williamsburg.
Grand street ferry to Williamsburg.
Walnut street ferry to Navy Yard, Brooklyn.
Hell Gate ferry to Astoria, Long Island.
Staten Island ferry to Staten Island.
Jersey City ferry from Courtland street.
Hoboken ferry from Barclay street.

Hudson River:

Newburgh ferry to Fishkill, N. Y.
Caldwell's ferry to Peekskill.
Poughkeepsie ferry to New Paltz.
Albany ferry to Greenbush.
Hudson ferry to Athens.

Boston, Mass.:

East Boston ferry.
Winnesimmit ferry.

Philadelphia, Pa.:

Market street ferry to Camden.
Arch street ferry to Camden.
South street ferry to Camden.
Browning's ferry to Camden.
Walnut street ferry to Camden.

The first steam ferry-boat at Philadelphia, Pa., was the "Camden," from Market street to Springer's ferry, at Camden, on May 10th, 1812. X

Greenpoint ferry, from East Tenth street, New York, was established in 1853. Lease dated October 30th, 1853.

St. Patrick's Cathedral ferry, from East Twenty-third street to Calvary Cemetery landing, through Newton Creek, was established in 1853. This ferry, after running a few

years, was purchased by the lessee of the Greenpoint ferry and the boats run to Greenpoint. Original lease made for ten years from December 27th, 1848.

Pavonia ferry, from the terminal of the New York and Erie Railroad at Pavonia, to Chambers street, New York, was opened in 1861, and to West Twenty-third street in 1868.

Hunter's Point ferry to East Thirty-fourth street, New York, was opened in 1856, and to James Slip in 1865.

Grand street, New York, to Broadway, Williamsburg, was opened in 1863.

Houston street ferry to Grand street, Williamsburg, was leased by the company in March, 1840.

Broadway, Williamsburg, to East Forty-second street, opened on December 2d, 1901.

TOWBOATS.

The first steam towboat built for the purpose of towing vessels was the "Rufus King," built by Smith & Dimon, for the New York Dry Dock Company, that was established in 1825, at the foot of East Tenth street, New York, to tow vessels to and from their railway. This vessel was but 102'x19'x7', with a square engine of 34" cylinder by 4 feet stroke, being like the small passenger boats of that day. Prior to this the small passenger boats during the dull seasons would engage in towing the large sailing vessels to and from the "Hook."

After the opening of the Erie Canal, in the fall of 1825, there was a new field of enterprise opened to the capitalist. It must be remembered that the Supreme Court of the United States had but a few months before given its decision in the case of the free navigation of the waters of the United States, and many passenger steamboats were now building for that service. But what to do with those that had been in service, that were inferior in speed and accommodations to the new vessels, was the question to many owners. The only use they could be put to was to try their fortune at towing. Some of the new ones built in the first few years of the free navigation of the waters soon proved their unfitness for the pas-

senger business, and they soon passed to towboats. After a few years the business of towing on the Hudson River passed into the hands of incorporated companies, so that by 1830 there was the Swiftsure line, controlled by A. Van Santvoord; the New York and Albany line, by John Newton, and the Troy line, by Philip Hart.

The first tugboat built for general service would appear to have been the "Hercules," of 190 tons, built at New York, in 1832, by Brown & Bell, for O. Mauran and others, who run a line of coastwise packets. The experiment could not have proved profitable, as at a later date she had been altered for other service.

The earliest towboat companies at Philadelphia, Pa., of which there appears to be any record, were, in 1836, those of the Lehigh Coal Company, the Philadelphia Steam Towboat Company, towing on the Delaware River and bay, and the Delaware Coal and Schuylkill Towboat Company. Most of their vessels were old passenger boats.

Prior to 1816 there were comparatively few sailing vessels larger than schooners calling at our ports, but after that date the American sailing packets from Europe of about 600 tons each required, in many cases, a towboat to bring them to their dock, that gave employment at times to the smaller passenger steamboats. These packets of increased size and number required attendance on arrival until about 1840, when the clipper ships of still larger size made their appearance, and it was at that time the side-wheel tugboat was brought into general use for both harbor and outside towing, though it was not for some years that vessels suitable for sea towing were built. At a later date came the "Jacob Bell," that was in government service during the Civil War, then the New York "Hook" boats, the "Ocean," "Screamer," "Mercury," "Satellite," "Huntress," "Achilles," "Ajax," "Underwriter," and "Titan." The largest of these side-wheel tugboats was the "Titan," built by Thomas Collyer, in 1852, for Russell Sturgis & Co. This vessel was 175'x29'x10'6", with a Morgan Iron Works beam engine of 60"x10 feet stroke. She was a heavily built and extra strong fastened vessel for her dimensions, to withstand the heavy weather she would be subjected to during outside work. This was one of a fleet composed of the

"Achilles," "Huntress" and "Ajax." The "Titan" met her fate when sent to give assistance to the ship "John Currier," that was ashore at Fenwick Island, on New Jersey coast, by getting ashore herself at Squan Inlet, on September 3d, 1856, in a heavy gale, where she became almost a total loss. Her engine was recovered, and a few years later placed in the Hudson River day line steamboat "Daniel Drew." These large tugboats appear to have been unfortunate. The "Ajax" went ashore at Long Branch, N. J., during an easterly gale on February 1st, 1858, and the "Hercules" was destroyed by fire while lying at Sandy Hook dock on May 14th, 1858.

Then came the "Leviathan," constructed by Eckford Webb in 1853, for Spofford Tileston & Co., with dimensions of 179'x 28'5"x11'6", with a beam engine of 60"x10 feet stroke, and water wheels of 29½ feet by 8 feet 4 inches face; two return-flue boilers, consuming one ton of anthracite coal per hour, and operated under an average steam pressure of 35 pounds. Her owners advised the builders, after she had been in service a short time, that the vessel had been sent to Warren, Rhode Island, and that the time from the Battery, at New York, to Stratford Lightboat, was 3 hours and 8 minutes; to New London Lightboat, 5 hours and 35 minutes, and to Newport wharf, 8 hours and 5 minutes. This is phenomenal for a vessel of her size, but the conditions were no doubt more than usually favorable. She was withal the most powerful tugboat on the coast at that time, and of much higher speed than many of our river boats. This vessel was destroyed by fire on March 20th, 1856, while towing a vessel, and when about four miles from Sandy Hook Lightship. After the "Leviathan" was burned the "William H. Webb" was built by William H. Webb, for James Chambers and Henry A. Heiser, for the same service of Sandy Hook towing. This vessel was somewhat larger than her predecessor, being 190'x31'x12', with a pair of beam engines, each of 44"x10 feet stroke, with water wheels of 30 feet diameter. This was the last of the large side-wheel tugboats on the coast, and she is well remembered by many of the old steamboat men around New York at this day. For a tugboat she was certainly the head of her class in appearance and ability. After doing service in New York waters until June, 1859, she was sold to New Orleans mer-

chants for towing the large sailing vessels from and to the passes to New Orleans. The towing on the lower Mississippi River at this time was controlled by one firm, and the vessel was purchased to break the monopoly from which the merchants of New Orleans had suffered so long. When the Civil War broke out in 1861 the vessel was still engaged in towing, but was at once taken by the Confederate naval authorities and converted into a gunboat, and for a time did service in the lower Mississippi River and Gulf of Mexico, but when the river was blockaded was taken to the upper Mississippi River and Red River, having meanwhile been fitted as a ram. Here she remained during all the period of the war, with but one or two brushes with the Union naval vessels. The greatest reputation she made was when the war was all over, and the cause in which the vessel had been engaged was found to be hopelessly lost, that the officer, a Captain Read, who had been in the United States Navy, in command, resolved to take the desperate chances of running the blockade of the river to the passes and then endeavor to reach Havana, Cuba. She left the Red River on April 22d, 1865, and passed down the Mississippi River, and was opposite the city of New Orleans at noon of the 24th of the month. When about 25 miles below the city she met the United States naval steamer "Richmond," on her way to the city, who gave her one broadside, and being pursued by one of the United States gunboats, was placed between two fires that compelled her crew to run her ashore at Culls Pass, when she was set on fire and destroyed. There was much excitement in New Orleans at the time of her passing, on account of the daring displayed in such an action, and with such small prospect of success.

These large side-wheel tugboats were at the height of their usefulness when the "W. H. Webb" was sold. The screw-propeller tugboat was in service at that day, but had not as yet taken a firm hold on the business in hand. The first of the propeller tugboats was named "Samson," hull built by William Cramp, and the machinery by Reanie, Neafie & Co., of Philadelphia, Pa., in 1850. In 1851, the same builders constructed a propeller tugboat for San Francisco harbor, with a pair of vertical direct-acting engines. This was the first of that type in tugboats. The next year I. P. Morris & Co., of

Philadelphia, Pa., built the machinery for the tugboat "America," for towing on the Delaware River to the Capes. This vessel was 135 feet long, and was fitted with a pair of trunk engines, each having cylinders 32"x30". She was fitted with two masts and sails. In 1853, the "Franklin" was built at Albany, N. Y., for towing service, but was shortly after taken through the Erie Canal to Buffalo, N. Y., for the same kind of work. In 1852, there was the propeller "Rescue," built for New York harbor, with a pair of vertical direct-acting engines. It will be noted that these engines were operated under a steam pressure of not exceeding 40 pounds to the square inch. The higher steam pressure did not come into use until 1860, when the "Resolute" and the "Reliance" were built by B. C. Terry, with the machinery by Cobb & Field, at Jersey City, N. J., for Capt. Albert De Groot. These vessels were intended for harbor towing, and were each 93'x16'x7'6, with engine 17"x17", having a return tubular boiler, with 4-inch tubes and two furnaces, and were operated under an average working pressure of 75 pounds of steam. The propeller was 7 feet eight inches diameter. These tugboats were completed in September, 1860, and in the following May the Navy Department purchased them for picket boats, for \$15,000 each. The "Reliance" was captured on the Rappahannock River, August 23d, 1863, and the "Resolute" was sold after the war was over. The boiler of one of these boats exploded while the vessel lay at the dock, and wrecked things generally.

There were many of these early propeller tugboats that were fitted with two separate engines connected to the same shaft. What brought about the greatest change in favor of the propeller was the adoption of the compound engine, for when that type of engine demonstrated its economy of fuel the side-wheel tugboat was doomed, except for some special work. The development of the propeller tugboat since then has been rapid. One of the marked features of its growth has been the size and power required for those towing coal barges from port to port along our sea coast. There are several of them as large as many of the gunboats that were in the United States Navy during the Civil War on blockade duty.

The first tugboat on the Atlantic coast having a compound engine was the "H. F. Hamill," by adding a 14-inch high-pressure cylinder on a 24-inch square low-pressure cylinder. This was done either in January or February, 1870, at Jersey City, N. J.



CHAPTER X.

HIGH SPEED.



THE question is very often asked, what is the highest speed that has been attained by our American river steamboats? An answer is as often given of a boat having made the run between certain points, in a stated time, that shows the vessel was traveling "at the rate of" from 25 to 30 miles per hour; very seldom is it found less than the former figure. This may be very satisfactory to some people. Men of experience in such matters know that the number of passenger steamboats able to obtain a velocity of 18 miles per hour for one or more hours is not five per cent. of the whole number, and when you go higher up in the scale of velocity until you reach 22 or 23 miles an hour, then you can almost count them on the fingers of both hands. Otherwise, the number of passenger steamboats that are able to attain 23 miles an hour for one hour even is very limited indeed in numbers. So far as 25 miles an hour is concerned, that has only been found in torpedo-boat destroyers, torpedo boats, and a few racing machines. This question of speed does not entertain any surrounding conditions. The main factor that is the cause of the miscalculation of the speed of a steamboat is the distance between the points covered by the vessel.

This "bottling up" the steam in the boilers of a steamboat and starting it off as a squirt-gun for a few miles, over a course where there is sufficient depth of water so it will not touch the bottom, and then make a claim of anything over 20 miles an hour, deceives but few people. The single measured mile course was popular at one time, but that has been laid aside as having served its day.

A steamboat that can be taken at times on her regular business trips, with a clean bottom and machinery in good order, and put through her paces with good tides and atmos-

pheric conditions in her favor, and make 21 miles and over an hour for three or more hours, is a rare exception. A few have made exceptional time but once and would live upon a reputation then gained that could hardly be repeated, while a less number have made phenomenal time and could be expected to repeat it under similar conditions.

The analysis of the logs of some of the Long Island Sound steamboats indicate that some of the so-called fast ones on the Hudson river have but a small margin of safety from a blighted reputation for speed when the figures of the best vessels on the Long Island Sound and Hudson River are examined. But it must not be forgotten there was a race on Lake Erie in 1901 where over 21 miles an hour was made *through the water*. That leaves a very small margin for many of the eastern boats.

It will be remembered this covers only our sound, river and lake navigation, and has no relation whatever to our sea-going steamers.

X To show that the position taken on this subject is substantiated by facts and figures, copies of the logs of a few of our Long Island Sound steamboats that will be readily recognized as being among those of the highest speed of their day, both past and present, are presented:

“LEXINGTON.”

New York to Providence, R. I., June 3, 1835.

	A. M.	Elapsed Time.
Left Providence.....	5.55	H. M.
“ Newport	7.49	1.54
Passed Beaver Tail Light.....	8.08	.19
“ Point Judith.....	8.41	.33
“ Watch Hill.....	10.04	1.23
“ Little Gull Light.....	11.04	1.00
“ Plum Island.....	11.27	.23
“ Faulkner’s Island Light.....	12.51	1.24
“ Old Field Point.....	2.38	1.47
“ Eaton’s Neck.....	3.37	.59
“ Sands Point.....	4.50	1.13
“ Throgg’s Neck	5.16	.26
Arrived Pier 1, North River.....	6.09	.53
Dock to dock.....		<u>12.14</u>

Speed of vessel per hour from Point Judith to Throggs Neck, 14.9 miles; from Watch Hill to Sand's Point, 15.12 miles; from Little Gull Island Light to Sand's Point Light, 15.29 miles; from Faulkner's Island Light to Sands Point Light, 15.16 miles, and from Sands Point Light to the Battery at New York, 17.26 miles per hour. High water at Hell Gate about 3.15 P. M.

The record time prior to this was by the "Boston," in June, 1832, of 14 hours and 39 minutes. X

"C. VANDERBILT."

New York and Stonington, Conn., June 7, 1847.

	P. M.	Elapsed Time. H. M.	Tide.
Left Pier 1, North River:			
Passed Point of Hook...	5.16	Ebb against
" Throggs Point...	6.05	.49	Boat.
" Sands Point.....	6.24	.19	Ebb with
" Huntington	7.28	1.04	Boat.
" Stratford Light-			
ship	8.21	.53	"
" Faulkner's Island			
Light	9.38	1.17	"
" *Saybrook Light.	10.29	.51	"
" Bartlett Reef			
Lightship	11.04	.35	"
Arrived Stonington			
Wharf	11.48	.44	"
		<hr/> 6.32	

* There was no light vessel at Long Sand Shoal, off Cornfield Point, until 1865. Prior to this the time was taken at Saybrook Light.

Add 12 minutes from dock to Corlears Hook—or Point of the Hook—on the East River, makes it 6 hours and 44 minutes from dock to dock. The speed of the vessel from Sands Point to Stratford Shoal Lightship was 18.21 miles per hour. From Sands Point to Bartlett's Reef Lightship, 18.89 miles per hour; and from Faulkners Island Light to Bartlett's Reef Lightship, 19.51 miles per hour.

“ OREGON.”

New York to Stonington, Conn., June 8, 1847.

	P. M.	Elapsed Time. H. M.	Tide.
Passed Point of Hook....	5.15		First ebb
“ Throggs Point....	5.57	.42	against
“ Sands Point.....	6.15	.18	Boat.
“ Huntington	7.13	.58	Ebb with
“ Stratford Shoal			Boat.
Lightship	8.06	.53	“
“ Faulkner's Island			
Light	9.20	1.14	“
“ Saybrook Light..	10.09	.49	“
“ Bartlett's Reef			
Lightship	10.39	.30	“
Arrived Stonington Dock.	11.18	.39	“
		<hr/> 6.03	

Add 12 minutes from Pier 1 North River to Point of Hook, makes 6 hours and 15 minutes from dock to dock. Speed of the vessel from Sands Point to Stratford Shoal Lightship, 19.19 miles per hour; from Sands Point to Faulkners Island Light, 19.58 miles per hour; and from Stratford Shoal Lightship to Bartlett's Reef Lightship, 20.66 miles per hour.

"C. VANDERBILT."

New York to Stonington, Conn., May 21, 1850.

	Elapsed Time. H. M.	Tide.
Left Pier 2, North River:		
Passed Point of Hook.....	...	Flood.
" Throggs Point.....	.41	"
" Sands Point19	"
" Huntington	1.02	Ebb with
" Stratford Shoal Lightship.	.55	. Boat.
" Faulkners Island Light...	1.23	"
" Saybrook Light48	"
" Bartletts Reef Lightship..	.30	"
To Stonington Dock.....	.40	"
	<hr/> 6.18	
Add 12 minutes to Point of the		
Hook12	
Dock to Dock.....	<hr/> 6.30	

"METROPOLIS."

New York to Fall River, June 9, 1855.

	P. M.	Elapsed Time. H. M.	Tide.
Left Pier 3, North River:	5.09		
Passed Throggs Point....	6.00	.51	Flood.
" Sands Point.....	6.18	.18	"
" Huntington			
Light	7.18	1.00	Ebb.
" Stratford Light-			
ship	8.09	.51	"
" Faulkners Island			
Light	9.23	1.14	"
" Saybrook Light..	10.10	.47	"
" Gull Island Light.	10.43	.33	"
" Stonington due N.	11.13	.30	"
" Watch Hill Light.	11.18	.05	"
" Point Judith....	12.20	1.02	"
Arrived at Newport.....	1.00	.40	
		<hr/> 7.51	

Running time, New York to Fall River, 8 hours and 51 minutes, on the authority of Erastus W. Smith, Superintending Engineer of the Line at the time.

The run from Execution Rocks (or Sands Point) to Point Judith was made at a speed of 20.26 miles per hour; from Stratford Lightship to Watch Hill Light at a speed of 21.24 miles per hour; and from Saybrook Light to Watch Hill Light at a speed of 21.93 miles per hour.

"CITY OF BOSTON."

New York and New London, Conn., July 4, 1865.

	P. M.	Elapsed Time. H. M.	Tide.
Left Pier 39, North River.	5.02		Flood.
Passed Throggs Point...	5.57	.55	"
" Sands Point	6.17	.20	"
" Huntington	7.17	1.00	Ebb.
" Stratford Light- ship	8.09	.52	"
" Faulkner's Island Light	9.25	1.16	"
" Cornfield Light- ship	10.06	.41	"
" New London Light	10.54	.48	"
Arrived at Dock, New London	11.07	.13	"
		<hr/> 6.05	

Average speed per hour the whole distance, 19.73 miles. Between Execution Rocks Light and New London Light 20.19 miles per hour; and from Stratford Shoal Lightship to New London Light 20.98 miles per hour; and from Cornfield Lightship to New London Light at a speed of 23 miles per hour. The vessel was running light, with little if any freight and but few passengers, on account of it being a holiday.

"RHODE ISLAND."

New York and Stonington, Conn., as a day boat, August 30, 1873.

	Elapsed		Tide.	Rev.
	P. M.	Time.		
Left 23d St., East River..	2.33	H. M.	First of	
Passed Hell Gate.....	2.48	.15	Ebb	
“ Rikers Island....	2.59	.11	against	
“ Whitestone	3.10	.11	Boat.	
“ Throggs Point....	3.16	.06		
“ Stepping Stones..	3.22	.06		
“ Hart’s Island....	3.27	.05	Ebb.	18½
“ Sands Point Light	3.35	.08		
“ Captains Island “	4.04	.29		
“ Huntington “	4.35	.31	Ebb.	18½
“ Stratford Light				
Ship	5.30	.55		
“ Faulkner’s Island				
Light	6.47	1.17	Ebb.	18½
“ Cornfield Light				
Ship	7.30	.43		
“ Bartlett’s Reef				
Light Ship....	8.08	.38	Ebb.	18½
“ North Hummock				
Light	8.25	.17		
“ Eel Grass Light..	8.39	.14	Ebb.	18½
Arrived Stonington Dock.	8.49	.10		
		6.16		

Allowing 24 minutes from Stonington Pier, North River, to Pier at 23d street, East River, would make the time from Stonington Line Pier on North River to Stonington as 6 hours and 40 minutes. On this trip between Cornfield Lightship and Bartlett’s Reef Lightship a speed of 21.17 miles per hour was made. An increase of speed is noticed in this locality in all the records given when going to the eastward, on account of the increased tidal flow from Cornfield Lightship to and through “the Race.” Between Stratford Lightship and North Hummock Light a speed of 20.05 miles per hour was attained for 58.5 miles.

"CITY OF LOWELL."

New York and New London, Conn. Iron propeller wheels.

October 9, 1894.

	P. M.	Elapsed Time. H. M.	Tide.
Left New York, Pier 40..	5.33		First of ebb
Passed Throggs Neck....	6.28	.55	at the "Gate."
			Last of flood
" Sands Point			against
Light	6.44	.16	Boat.
" Huntington Light	7.38	.54	Slack water.
" Stratford Shoal			Ebb with
Light	8.23	.45	Boat.
" Faulkner's Island			
Light	9.34½	1.11½	"
" Cornfield Light			
Ship	10.13	38½	"
" Bartlett's Reef			
Light Ship....	10.47	.34	"
" New London			
Light	11.00	.13	"
New London—Steam off.	11.10	.10	

Running time, dock to dock, 5 hours and 37 minutes.

Running time, Throggs Neck to New London Light, 4 hours and 32 minutes. Speed per hour over whole distance run of 120.2 miles is 21.4 miles. From Throggs Neck to New London Light, 21.9 miles; from Stratford Shoal Light to New London Light, 22.05 miles; and from Cornfield Light Ship to New London Light, at a speed of 23.5 miles per hour with last of the ebb tide.

On October 11, 1894—two days after the previous trip—the "City of Lowell" made another fast run to the eastward from dock to dock, in 5 hours and 36 minutes; and from Stratford Shoal Light to New London Light in 2 hours 30½ minutes,

or at a speed of 23.04 miles per hour. The best time in the Sound outside the "Race" of which there is any available record, was made on this trip from Stratford Shoal Light to Cornfield Light Ship in 1 hour 42½ minutes, from 8.35½ P. M. to 10.18 P. M., or at a speed of 23.02 miles per hour.

"CITY OF LOWELL."

Bronze propeller wheels. May 30, 1895.

	P. M.	Elapsed Time. H. M.	Tide.
Left New York, Pier 40	5.37		Last of ebb
Passed Throggs Neck..	6.50	1.13	against boat.
" Sands Point...	7.06	.16	Last of ebb
" Huntington			with boat.
Light	7.59½	.53½	
" Stratford Shoal			
Light.....	8.43	.43½	First of flood
" Faulkner's Is'nd			against boat.
Light	9.54	1.11	
" Cornfield Light			
Ship	10.33	.39	Flood against.
" Bartlett's Reef			
Light Ship..	11.12	.39	" "
" New London			
Light	11.25	.13	" "
New London — Steam			
off	11.32	.07	" "
At dock.....	11.37		

Running time, dock to dock, 6 hours, or an average speed of 20.03 miles per hour. This was a very fast run, with a head tide most of the distance covered. The time from Execution Rocks Light to Cornfield Light Ship shows very high speed with an adverse tide a portion of the distance, 3 hours and 27 minutes, or 21.68 miles per hour.

"PRISCILLA."

New York to Fall River, Mass., June 20, 1894.

	A. M.	Elapsed	Tide.
		Time. H. M.	
Left Newport, R. I.....	7.16		
Passed Castle Hill.....	7.31	.15	
" Point Judith.....	7.58	.27	Flood.
" Watch Hill.....	8.57	.59	"
" Little Gull Light....	9.33	.36	"
" Cornfield Light Ship.	10.09	.36	"
" Faulkner Isl'd Light.	10.47	.38	"
" Stratford Light.....	11.55	1.08	"
" Eatons Neck.....	12.40	.45	Ebb.
" Captains Island.....	1.10	.30	"
" Execution Rock Light	1.39	.29	"
" Throggs Point.....	1.56	.17	Ebb with
" Battery, N. Y.....	2.45	.49	boat.
		<hr/> 7.29	

High water at Hell Gate, 11.03 A. M.

The distance from Newport wharf to the Battery at New York was covered at an average speed of 21.11 miles per hour. From Point Judith to Execution Rocks Light at a speed of 21.50 miles per hour; and from Watch Hill Light to Stratford Shoal Light, a distance of 66.9 miles, at a speed of 22.55 miles per hour; and from Cornfield Light Ship to Watch Hill Light, a distance of 27.6 miles, in 1 hour and 12 minutes, or a speed of 23 miles per hour. The tide was favorable for the vessel during most of the trip. It will be noticed that the increase of the speed while running from Watch Hill to Cornfield Light is not as great as in some of the other vessels, thus confirming the claim that all fast runs are made to the eastward to obtain the benefit of the swift-running tide through "the Race," that runs there better in that direction than to the westward. This run was made just after the vessel had been completely furnished in her passenger accommodations, and prior to being placed in commission. This time has never been equalled on the whole distance covered, and has never been equalled between any two of the points named, with but one exception. The time made shows it was no ordinary trial trip, although there may not have been the

refinements of a speed trial as understood for our naval vessels. With the fact that the run was to the westward, and the tide was not favorable the entire distance, shows the vessel to be one of the most speedy steamboats that has been in the passenger service on Long Island Sound.

"RICHARD PECK."

New York and New Haven Line.

Speed on the measured mile in September, 1892, 20.25 miles per hour. The highest speed attained for any distance of note, when new, was in 1893, on a trip from New York to New Haven in 3 hours and 52 minutes, and New York dock to New Haven Light in 3 hours and 32 minutes. No date is given to find the tidal conditions. Assuming that her time from New York dock to Execution Rocks Light was 1 hour and 10 minutes, or a speed of 18.64 miles per hour, leaves 2 hours and 22 minutes for the distance from Execution Rocks Light to New Haven Light, a distance of 49.79 miles, or a speed of 21.03 miles per hour.

On Sunday, June 15, 1902, another fast trip was made, this time to the westward, from New Haven dock to Peck Slip dock, in 4 hours and 4 minutes, less stop at 21st Street of 12 minutes, leaving elapsed time 3 hours and 52 minutes.

	P. M.	Elapsed Time. Minutes.
Left New Haven Dock.....	3.26	
Passed South-west Ledge Light.....	3.47	21
" Stratford Point Light.....	4.23	36
" Penfield Reef Light.....	4.44	21
" Green Ledge Light.....	5.21	37
" Captains Island Light.....	5.50	29
" Execution Rocks Light.....	6.15	25
" Stepping Stones Light.....	6.26	11
" Throggs Point.....	6.31	5
" Whitestone	6.36	5
" Hunts Point.....	6.44	8
" North Brothers Island.....	6.48	4
" Hell Gate.....	6.56	8
Arrived at 21st St. E. R. Dock.....	7.06	10
Left 21st St. E. R. Dock.....	7.18	
Arrived at Peck Slip.....	7.30	

Full sea at New Haven at 7 P. M.; at Hell Gate 5.56 P. M.

	Miles per hour.
From S. W. Ledger Light to Execution Rocks	
Light	20.19
" Penfield Reef Light to Execution Rocks	
Light	20.93
" Great Capt. Island Light to Execution	
Rocks Light.....	20.4
" Execution Rocks Light to 21st St., E. R..	22.35
a distance of 19 miles.	

In 61 consecutive trips from New York to New Haven—dock to dock—in the summer of 1902, the vessel made the first thirty trips in an average of 4 hours 18 ⁶/₁₀ minutes, and the thirty-one to complete this number of trips in an average of 4 hours and 22 ⁶/₁₀ minutes, or an average of the whole of 4 hours 20 ⁶/₁₀ minutes. •

"PURITAN".

Fall River Line.

Placed in commission in June, 1889.

On August 7 following, made first fast trip from New York to Fall River in 8 hours and 47 minutes, leaving New York at 5.38 P. M., and arriving at Fall River at 2.25 A. M. High water at Hell Gate this day at 6.29 P. M., and high water at Little Gull Island at 6.11 P. M., showing the trip was made under favorable conditions of the tide. This was during the regular business.

The next trip, out of the ordinary routine of transportation, was one made on May 26th, 1893. The vessel had just come off the dry dock, where her bottom had been cleaned and painted, and was sent east to take the place of the "Providence" on the route. It was at this time there was so much interest manifested in the speed of the "Puritan" and the "Richard Peck." On this day the "Puritan" left New York, running light, at 3.17 P. M., the "Richard Peck" leaving for New Haven at 3.30 P. M., and whether there was a trial of speed there seems to be a doubt, but a comparison of figures would settle all differences of the best stayer in a long run. The tide was running flood to the Sound in favor of the boat,

and flood through the Sound to about Faulkners Island against the boat, and from there ebb tide, or in favor of the boat. The running time made between Stratford Shoal Light and Point Judith Automatic Whistling Buoy was in 4 hours and 2 minutes, a distance of 86.7 miles, or 21.5 miles an hour. Average revolutions of engine, 22.8 per minute. All her boilers were in service during this trip. She only went as far as Newport, arriving there at 11.25 P. M., making the trip in 8 hours and 8 minutes.

Her last fast trip, and the best ever made by the vessel was on June 8th, 1899, when just off the dry dock, foot Pike Slip, and sent light to Fall River, to take the place of one of the other boats. Her log for this trip reads, viz.:

	A. M.	Elapsed Time.
Left Dry Dock.....	9.25	H. M.
Passed Hunts Point.....	9.59	.34
“ Throggs Point.....	10.13	.14
“ Executioners	10.32	.19
“ Captains Island.....	10.55	.23
“ Eatons Neck.....	11.30	.35
“ Stratford Light.....	12.18	.48
“ Faulkner's Island Light....	1.30	1.12
“ Cornfield Light Ship.....	2.08	.38
“ Plum Island.....	2.29	.21
“ Gull Island Light.....	2.43	.14
“ Watch Hill.....	3.23	.40
“ Point Judith.....	4.18	.55
“ Brenton's Reef Light Ship..	4.42	.24
“ Castle Hill.....	4.49	.07
“ Rose Island.....	4.56	.07
“ Gould Island.....	5.03	.07
“ Sandy Point.....	5.18	.15
“ Bristol Ferry.....	5.28	.10
“ Olivers	5.46	.18
Arrived at Fall River.....	5.49	3

Running time, 8 hours and 24 minutes, a distance of 174.25 miles, or a speed for the entire distance of 20.74 miles per hour. From Execution Light to Watch Hill, 102.4 miles, a speed of 21.11 miles per hour. From Stratford Shoal Light

to Point Judith, a speed of 21.675 miles per hour, a distance of 86.7 miles. From Stratford Shoal Light to Watch Hill, 21.7 miles per hour. From Cornfield to Watch Hill, 27.6 miles, a speed of 22.08 miles per hour; and from Cornfield to Little Gull Light, 13.4 miles, a speed of 22.98 miles per hour. Average revolutions of engine from Execution Light to Point Judith, 21.75 per minute, and from Castle Hill to Fall River, 22 per minute. The tidal conditions were the last of the flood to the Sound, and there the ebb. High water at Little Gull Island at 9.18 A. M.

The best time that has been made by the New York and Portland propellers was that by the "John Englis," in 18 hours and 40 minutes, and by the "Horatio Hall," in 19 hours and 20 minutes. The "North Star" tried several times, when new, for a record, but fogs or an unusual number of detentions prevented the vessel making any fast time.

"NEW HAMPSHIRE."

New York to Stonington, Conn., July 28, 1895. Single-screw propeller.

	P. M.	Elapsed Time.	Tide.
Left Stonington.....	11.17	H. M.	
Passed North Hummock...	11.39	.22	High tide
" Bartlett's Reef			Little Gull,
Light Ship.....	11.57	.18	July 29, at
" Cornfield Light			3.05 A. M.
Ship	12.37	.40	
" Faulkner's Island...	1.19	.42	
" Stratford Shoal			
Light	2.36	1.17	
" Huntington	3.27	.51	
" Sands Point.....	4.26	.59	
" Throggs Neck.....	4.43	.17	High water
" North Brothers....	5.00	.17	at Hell Gate
" Hell Gate.....	5.07	.07	3.40 A. M.
Arrived Pier 36, North			
River	5.40	.33	
		<hr/> 6.23	

From North Hummock to Stratford Shoal Light, 20 miles an hour. From Stonington to Throggs Neck, 19.83 miles. This vessel made a fast run from New York to Wilmington, Del., on March 21, 1897. Left Pier 39, North River, at 8.52 A. M., passed Sandy Hook at 10 A. M., Barnegat at 12.52 P. M., Absecom at 2.48, and Cape May at 5.12 P. M. Passed Brandywine Shoals Light at 6.23, Ship John Shoal Light at 7.52, and arrived at Wilmington Creek, Wilmington, at 9.42 P. M. Time, 12 hours and 50 minutes; distance, 226 miles. Wind, S. W. to S. S. E.; heavy and easterly swell. From Battery at New York to Cape May Light, 150.78 miles. Had no cargo nor passengers on this trip.

"WILLIAM G. PAYNE."

New York and Bridgeport, Conn., Friday, June 27, 1902.

	P. M.	Elapsed Time.
Left Pike Slip.....	3.03	Min.
" 31st St., East River.....	3.22	19
Passed Rikers Island.....	3.45	23
" Fort Schuyler.....	4.03	18
" Execution Light.....	4.21	18
" Captains Island.....	4.47	26
" Norwalk Light.....	5.17	30
" Penfield Reef Light.....	5.55	38
" Bridgeport Light.....	6.09	14
Dock at Bridgeport.....	6.18	09

Head tide to Captains Island, and favorable thence to Bridgeport. Weather clear with a west-north-west wind, having a movement of 16 to 20 miles per hour during the afternoon, that was in favor of the boat through the Sound. High water at Hell Gate, 2.16 P. M.

Speed per hour from 31st Street to Penfield Reef Light, 19.69 miles. From 31st Street to Execution Rocks Light, 18.82 miles per hour. From Execution Rocks Light to Penfield Reef Light, 20.26 miles per hour. This trip compares favorably with the "Richard Peck's" fast trip, June 15, 1902. Developed on trial trip 19.775 miles per hour.

On October 28, 1902, when the flood tide was about two hours old through Hell Gate, the "W. G. Payne" made the run

from 31st Street to Execution Rocks Light in 50 minutes, which gives her a speed of 22.2 miles per hour. The day before, the same distance had been covered in 52 minutes. The distance between these points has been run by the better class of steamboats under similar conditions in fully as good time.

The taking of elapsed time between Execution Rocks Light and Captains Island Light is a delusion and a snare, for the distance can be made anywhere from 8 to 9 miles to suit the officer of a vessel. This is a condition. It does not refer to any line or vessels navigating Long Island Sound.

HUDSON RIVER STEAMBOATS.

When we come to our river steamboats there are but few logs to refer to for the running time, but must rely for that item on interested parties who have been found reliable. The distances are from the United States Coast Survey Bureau.

The "slow downs" or shutting off to one-half speed in passing tows in the river, is an element of more than passing interest that has been but seldom taken into account when fast time was being considered. Above Poughkeepsie is where the rule must be adhered to more strictly than in the opposite direction; and if there are five or six tows met on a trip, with a loss of say $2\frac{1}{2}$ minutes each, there is in the aggregate a loss of 12 to 15 minutes on the whole trip. The more meetings, the greater the loss of time. Years ago, when the canal business was much larger comparatively than of later years, there were a larger number of tows on the river than, say since 1855. We find prior to 1850 there were seven steam tow-boat lines on the river, having 62 steam tow-boats in service, between Albany and Troy and New York, towing canalers. This was the route for freight to the West until the Hudson River Railroad was completed and made connections with the railroads running between Albany and Buffalo in 1852, and the completion of the Erie R. R. about the same time, when the business of the canals in a few years began to fall off. The large number of tows on the river at times certainly had the effect to increase the running time of the steam-

boats, as the latter are required to slow down in passing them. There has been no reliable data handed down showing the effect on the running time.

There has always been, since they were built, and probably always will be, a division of opinion as to the steamboats on the Hudson River that belong in the class of 20 miles an hour and over, but probably a few figures may be of service to show the standing of many of the steamboats that have been and are on the river of the first-class in speed.

“FRANCIS SKIDDY.”—June 30, 1852.

Chambers Street, New York, to Hudson, $116\frac{3}{8}$ miles, 5 hours and 23 minutes less 5 landings; running time, 5 hours and 3 minutes. Speed per hour, 23.04 miles.

“DANIEL DREW.”—October 13, 1860.

Jay Street, New York, to Hudson, $116\frac{1}{4}$ miles, 5 hours and 30 minutes; running time, 5 hours and 5 minutes. Speed per hour, 22.89 miles. This trip was made with a strong north-east or head wind.

“ALIDA.”—May 5, 1848.

New York to Hudson; running time, 5 hours and 20 minutes. Speed per hour, 21.8 miles.

“MARY POWELL.”—August 7, 1874.

Vestry Street, New York, to Poughkeepsie, $74\frac{3}{4}$ miles, in 3 hours and 19 minutes running time. Speed per hour, 22.54 miles. Time to Newburg, 59.75 miles in 2 hours and 38 minutes; speed per hour, 22.7 miles. High water this day at Governor's Island, New York, 4.21 P.M.; at Newburg, 7.36 P.M., and at Poughkeepsie, 8.15 P. M. The conditions of the weather from the records of the Weather Bureau, show that the P. M. observation at New York was a southeast wind *having a velocity of 22 miles per hour*, an excellent combination for fast time up the river.

On June 7, 1881, made the run to Poughkeepsie in 3 hours and 33 minutes running time. High water at New York at 4.29 P. M.; southerly wind, 9 miles per hour, with rain all day.

The vessel was operated on her fast runs by a steam pressure not exceeding 35 pounds, and cutting off at $\frac{5}{8}$ of the stroke of the piston.

“ALIDA.”—July, 1860.

New York to Poughkeepsie, 3 hours and 27 minutes. Speed per hour, 21.52 miles.

“SYLVAN DELL.”—October 18, 1872.

Vestry Street, New York, to Poughkeepsie, in running time of 3 hours and 40 minutes. Speed per hour, 20.24 miles. This was a speed trial to Albany. Particulars on another page.

“ALBANY.”—On May 12, 1880,

An engineer's trial trip was given the vessel to about Tarrytown, and on July 3, 1880, the vessel was put in commission. She was not speeded until after the close of business of the line for the season. On October 22, the vessel was taken to Albany with the purpose to lay her up for the winter, and at the same time to see what she was capable of doing as far as Poughkeepsie. The vessel left 22d Street at 11.01 A. M., passed Newburg at 1.30 P. M., and arrived at the dock at Poughkeepsie at 2.09. The weather conditions at New York in the morning were a southeast wind at 8 miles per hour, shifting to a northeast wind at 16 miles per hour. The tidal conditions were high water at Governor's Island at 10.56 A. M., and at Poughkeepsie at 2.50 P. M. Time from 22d Street, New York, to Poughkeepsie, $727\frac{7}{8}$ miles, in 3 hours and 8 minutes. Speed per hour, 23.26 miles.

The latest run for a record on the Hudson River was made by the “New York” on May 28, 1903, the day the line opened for business, and the time made between 22d Street and Poughkeepsie was so close to that made by the “Albany,” in 1880, that the difference is in seconds only. The conditions of the weather were a south-west wind during the whole trip, with a wind velocity of 12 miles for the first hour, 11 miles for the second hour, and 10 miles per hour for the remaining time. The tidal conditions were high water that morning at Governor's Island, at 8.48, and it was generally observed at

the time that it was an unusually strong flood tide. The pilot-house time of the vessel was:

	A. M.
Left Debrosses Street Pier, New York.....	8.42.00
Passed 22d Street, New York.....	8.49.00
“ 129th Street, New York.....	9.04.00
“ Fort Washington Point.....	9.10.00
“ Yonkers	9.26.00
“ Stony Point.....	10.28.00
“ West Point.....	10.56.20
“ Newburgh	11.19.40
Stopped at Poughkeepsie.....	11.57.20

Speed per hour from 22d Street to Newburgh, 23.08 miles; and from 22d Street to Poughkeepsie, 23.21 miles per hour. This shows a higher rate of speed between Newburgh and Poughkeepsie than below Newburgh.

When the conditions of the weather and the tide during the trips named of the “Albany” and the “New York” are compared, and also the fact of the former being then fitted with the ordinary radial wheel is taken into consideration, it may not be far out of the way to say that the “Albany,” under the same conditions as the “New York,” would be able to hold her own, even with her increased age. These are the two fastest passenger steamboats for a run to Poughkeepsie that have been on the river, but the “Francis Skiddy” and the “Daniel Drew” must be reckoned with in the long run to Albany.

Taking the fast trips to Albany from the time of the “South America,” in 1843, to that of the “Chauncey Vibbard,” in 1866, and the average time does not vary more than 20 minutes, except in two instances. The average time would be about 7 hours and 30 minutes, and from this deduct say 20 minutes for landings, leaving 7 hours and 10 minutes running time to Albany, a distance of 144 miles, as the landings in New York City were about Chambers Street, giving an average speed of 20.18 miles per hour. From Hudson to Albany, it will be remembered, is very shoal water for these large boats, that requires them to reduce their speed. The most notable through trip between the two cities made in

fast time was that of the "South America," on April 19, 1843, while running in the "Through line with no landings." The vessel left Albany that evening at 6.50, and arrived at New York at 2.16 the next morning, making the trip in 7 hours and 26 minutes, dock to dock. The vessel was highly favored on this run, as there was a heavy freshet in the river that had covered the docks at Albany for two days to the depth of about two feet. The only tidal condition that was not in her favor was in the lower part of the river, where for a time there was the flood tide: high water at New York about midnight. At the time the vessel made the fast run on May 30, 1844, as a day boat, it was high water at New York at 6.52 A. M., and there was a high S. S. E. wind blowing at New York. They had not got so far along as measuring the velocity of the wind in those days. This was no doubt a very fast trip.

There has been no occurrence that points so conclusively to the limit of 24 miles an hour as the maximum speed of our river and Sound boats as the race between the "Tashmoo" and the "City of Erie," on Lake Erie, on June 4, 1901, where these steamboats raced on a straight course along the south side of the lake, starting from a line off the water-works crib, six miles outside the breakwater at Cleveland, Ohio, to a line 10 miles off Presque Island Light House, at Erie, Pa. The distance between these two points, from the best authorities on the subject, varies from 94 to 95.25 miles, but the former distance has been more generally accepted. The time of running for the vessels was: the "City of Erie," 4 hours 19 minutes and 9 seconds, and the "Tashmoo," 4 hours 19 minutes and 54 seconds, the "City of Erie" winning by 45 seconds. Speed per hour, "City of Erie," 21.76 statute miles, and the "Tashmoo," 21.70 miles per hour. This is through the water, without any tidal influence.

There have been many absurdities handed down to us regarding steam navigation, but none that will stand so slight an analysis as this: "The fastest time made on the river between New York and Albany was by the 'South America,' in 6 hours and 35 minutes." Well, let us analyze these figures, and see what is the result. It is no doubt running time and no landings. We will start from Albany to Hudson, 28½ miles, for the simple purpose to find the rate of speed in deep

water. Assuming this distance to have been covered in 1 hour and 45 minutes, or at the rate or average speed of 16.3 miles per hour, and that would be fast traveling in that part of the river, prior to 1850, or possibly later, there remains 4 hours and 50 minutes for the distance between Hudson and New York of $116\frac{1}{4}$ miles, or 24.07 miles per hour, while the average speed over the whole distance would be 21.99 miles per hour. The "South America," with a flood behind her, going south, never came near to these figures by 51 minutes, and with a high south-east wind behind her, going north, lacked touching 6.35 by 39 minutes. Neither the "Francis Skiddy" nor the "Daniel Drew," either of which were of as high average speed as the "South America," could touch the 6.35 mark. The "Albany" or the "New York" would probably have left but little outside the mark on their fast runs to Poughkeepsie, if continued to Albany. It may be done in the future. It has not been done yet. There is no doubt with the vast improvement in the channel of the upper river in the last twenty-five years but that more regular and better time can be made than at any period before, due to the freedom from extreme low water on the shoals and bars. This was something they could not do during the days of the rivalry with the large boats on the river.

The "Sandy Hook" and the "Monmouth," of the New York and Sandy Hook route, when new and running to Sandy Hook dock, made the run, dock to dock, 19.1 statute miles, in 56 minutes, equal to 20.47 miles per hour. At a later date, when running to dock at Atlantic Highlands, the best time made was 1 hour and 3 minutes, about 3 miles being in shoal water; but from Southwest Spit Buoy No. 12 to Pier 9, North River, a distance of 16.1 miles, in 47 minutes, equal to a speed of 20.57 miles per hour.

The question has been asked of late years, what per cent. of increase in speed has there been found in our river and Sound steamboats in the last fifty years. As to our ocean and coastwise steamships, the increase of speed has been so marked as to leave no doubt on the subject. But with the inland vessels it appears to be different. Take the fast trip of the "Francis Skiddy," in 1852, and the "Albany," in 1880. These boats can be taken as the representatives of the fast

boats of their period on the Hudson River. The difference in their rate of speed is not 4 per cent., while that between the "Daniel Drew" and the "Albany" is a trifle over 4 per cent., both in favor of the latter. When the Long Island Sound steamboats are compared, there is found a larger per cent., taking the "Metropolis" and the "City of Boston" as the earlier boats, with the "Priscilla" and the "City of Lowell" as the present-day representatives. Between the "Metropolis" and the "Priscilla," from Stratford Shoal Light to Watch Hill Light, there is an increase in speed of over 6 per cent. in favor of the "Priscilla." Between the "City of Boston" and the "City of Lowell," from Stratford Shoal Light to New London Light, there is a difference of over 10 per cent. in favor of the "City of Lowell." The present-day representatives here named are in all probability so evenly matched in speed that on a 100-mile run, or more, the result, barring accidents, would depend on the auxiliary portion of the machinery operating without fault.

These figures do not show a very large per cent. of increase in speed for the last forty or fifty years, with the one exception on Long Island Sound. The matter of increased size of the vessels of later years, with the additional weight of hull and joiner work, and the higher steam pressure, has not been taken into consideration in comparing these figures. These refinements are left to the marine architect and the engineer.

X TIME OF STEAMBOATS ON THE HUDSON RIVER.

NEW YORK AND ALBANY.	H. M.
"Clermont"—1807	36.00
"Car of Neptune"—March, 1812.....	20.00
"Paragon"—1820	27.00
"James Kent"—August 19, 1823.....	20.00
"Chief Justice Marshall"—1825.....	14.30
"Sun"—June 6, 1826; 13 landings.....	12.16
"New Philadelphia"—August 24, 1826; north.....	12.23
"Novelty"—May 31, 1832; south.....	9.47
"Champlain"—August 23, 1832; north.....	9.49

NEW YORK AND ALBANY.—(*Continued.*)

H. M.

"North America"—September 22, 1832; north.....	9.18
"De Witt Clinton"—April, 1832; 5 landings.....	10.44
"Swallow"—October 8, 1836; north.....	8.42
¹ "Rochester"—November 8, 1836; north.....	8.57 X
"Troy"—May 19, 1841; south; 5 landings.....	8.10
"Troy"—June 9, 1841; 11 landings.....	8.42
"South America"—April 19, 1843; south.....	7.26
"South America"—May 30, 1844; north.....	7.58
Less 11 landings.....	7.14
"Alida"—May 8, 1847; south; 6 landings.....	7.56
"Alida"—May 5, 1848; south; low water at New York 2.40 P. M.....	7.55
² "Alida"—May 6, 1848; north; 7 landings; tide against boat; high water at New York 11.16 A. M.	8.10
"New World"—May 29, 1851; north; 6 landings; N. E. wind; high water New York, 7.50 A.M.	7.43
"Reindeer"—May 31, 1851; south; 7 landings.....	7.44
³ "Reindeer"—July 1, 1851; south; 6 landings.....	7.44
"Francis Skiddy"—June 30, 1852; north; 6 landings; high water at New York, 7.45 A. M...	7.30
"Glen Cove"—October 13, 1856; north; 6 landings; strong south wind; running time....	7.30
"Daniel Drew"—October 13, 1860; north; 5 landings; 6.50 running time; high water New York, 7.40 A. M.....	7.20
"Chauncey Vibbard"—June 4, 1866; north; 8 landings; high water New York, 8.13 A. M....	7.33

TO HUDSON.

H. M.

"Knickerbocker"—August 20, 1843.....	5.52
"Alida"—May 5, 1848; 5 landings.....	5.42
"Francis Skiddy"—June 30, 1852; 5 landings.....	5.23
"Daniel Drew"—October 13, 1860; 4 landings.....	5.30

¹ Racing with "Swallow."² Racing with "Hendrik Hudson."³ Racing with "Henry Clay."

TO POUGHKEEPSIE.

	H. M.
"Henry Clay"—August, 1852; 6 landings.....	3.55
"Alida"—July, 1860; 5 landings.....	3.27
¹ "Mary Powell"—August 7, 1874; 6 landings.....	3.39
"Mary Powell"—June 7, 1881; 6 landings; running time	3.33

Time of the "Sylvan Dell," New York to Albany, without landing, October 18, 1872; south-east wind 4 to 6 miles per hour. From Vestry Street, New York:

	Elapsed Time. H. M.
To Yonkers	0.46
" Piermont	1.09
" Tarrytown	1.16
" Stony Point.....	1.56
" Caldwell's	2.05½
" Cozzens	2.26
" Newburgh	2.55½
" Poughkeepsie	3.40
" Esopus Light.....	4.15
" Rondout	4.27
" Saugerties Light.....	5.00
" Catskill	5.33
" Hudson	5.47
" Four-Mile Point.....	6.05
At Albany.....	7.43

Fast trip of "Mary Powell," August 7, 1874:

	P. M.	Elapsed Time.
Left Vestry Street Pier.....	3.32½	
Opposite Fort Washington.....	3.57½	.25
" Spuyten Duyvel Bridge...	4.03	.30½
" Yonkers Steamboat Dock.	4.13½	.41
" Piermont Long Dock.....	4.33	1.00½
" Stony Point Light.....	5.15	1.43
" Caldwell's Steamboat Dock	5.23½	1.51
" Cozzens Hotel.....	5.42	2.09½
Left West Point Dock.....	5.50	
Arrived at Cornwall.....	6.03½	2.31
Left Cornwall.....	6.07½	
Arrived at Newburgh.....	6.19¾	2.47¼

¹ Excluding landings, 3 hours and 19 minutes.

Time from Vestry Street Pier to Newburgh, including landings at Cozzens, West Point, and Cornwall, 2 hours 47 $\frac{1}{4}$ minutes. Running time to Newburgh, deducting landings, 2 hours and 38 minutes. Good flood tide and south-east wind.

DISTANCES ON LONG ISLAND SOUND FROM NEW YORK CITY.

	Statute Miles.	Distance.
Battery at New York City, to Execution Rocks Light.....	22.75	
E. R. Light to Stratford Shoal Light.....	35.50	58.25
S. S. Light to Faulkner's Island Light.....	24.80	83.05
F. I. Light to Cornfield Light Vessel.....	14.50	97.55
C. Lt. Vessel to Bartlett's Reef Light Vessel.	13.40	110.95
B. R. Lt. Vessel to New London Light.....	5.00	115.95
N. L. Light to New London, at dock.....	2.50	118.45
Battery to Bartlett's Reef Light Vessel....	110.95	
B. R. Lt. Vessel to N. Dumping Light.....	5.80	116.75
N. D. Light to Stonington Breakwater.....	7.00	123.75
S. B. to Stonington, at dock.....	0.70	124.45
Battery to Cornfield Light Vessel.....	97.55	
C. Lt. Vessel to Plum Island Light.....	7.80	105.35
P. I. Light to Little Gull Light.....	5.60	110.95
L. G. Light to Watch Hill Point.....	14.20	125.15
W. H. Point to Point Judith.....	19.80	144.95
P. J. to Goat Island Light—Newport.....	13.00	157.95
G. I. Light to Fall River Wharf.....	17.80	175.75
Battery to Goat Island Light.....	157.95	
G. I. Light to Sassafras Point—Providence..	23.50	181.45
Peck Slip to Execution Rocks Light.....	21.75	
Execution Rocks Light to New Haven Light.	49.79	71.54
Execution Rocks Light to Penfield Reef Light	31.73	
Penfield Reef Light to Black Rock Light....	2.11	
Penfield Reef Light to Beacon, Bridgeport Breakwater	4.25	

DISTANCES ON THE HUDSON RIVER.

	Statute Miles.	Whole Distance.
West 22d St., N. Y., to Tarrytown Light.....	24 $\frac{1}{4}$	
Tarrytown to West Point Light.....	25 $\frac{3}{8}$	49 $\frac{5}{8}$
West Point Light to Newburgh Landing.....	8 $\frac{1}{4}$	57 $\frac{7}{8}$
Newburgh Landing to Poughkeepsie Landing.	15	72 $\frac{7}{8}$
Poughkeepsie to Rhinebeck Landing.....	15 $\frac{1}{4}$	88 $\frac{1}{8}$
Rhinebeck to Catskill Landing.....	21 $\frac{1}{2}$	109 $\frac{5}{8}$
Catskill to Hudson City Landing.....	4 $\frac{1}{2}$	114 $\frac{1}{8}$
Hudson City to Albany Landing.....	28 $\frac{1}{2}$	142 $\frac{5}{8}$
Pier 1, North River, to West 22d St.....	3 $\frac{1}{8}$	
Pier 1, North River, to Albany Landing.....		145 $\frac{3}{4}$

DISTANCES ON WATER FRONT OF NEW YORK CITY.

NORTH RIVER.		Statute Miles.
Battery to Pier 11, Cedar Street.....		1 $\frac{1}{2}$
“ “ “ 15, Vesey Street.....		3 $\frac{3}{4}$
“ “ “ 21, Duane Street.....		1
“ “ “ 27, Hubert Street.....		1 $\frac{1}{4}$
“ “ “ 33, Canal Street.....		1 $\frac{1}{2}$
“ “ “ 39, West Houston Street.....		13 $\frac{3}{4}$
“ “ “ 45, West 10th Street.....		2
“ “ “ Bethune Street.....		2 $\frac{1}{4}$
“ “ “ West Washington Market.....		2 $\frac{1}{2}$
“ “ “ West 14th Street.....		23 $\frac{3}{4}$
“ “ “ West 22d Street.....		31 $\frac{1}{8}$
“ “ “ West 28th Street.....		31 $\frac{1}{2}$
“ “ “ West 39th Street.....		4
EAST RIVER.		Statute Miles.
Battery to Pier 3.....		1 $\frac{1}{4}$
“ “ “ 8.....		1 $\frac{1}{2}$
“ “ “ 14, Maiden Lane.....		3 $\frac{3}{4}$
“ “ “ 20, Peck Slip.....		1
“ “ “ 33, Rutgers Slip.....		11 $\frac{1}{2}$
“ “ “ Jackson Street.....		2
“ “ “ East Street—Hook.....		21 $\frac{1}{4}$
“ “ “ Broome Street.....		21 $\frac{1}{2}$
“ “ “ 58, 6th Street.....		3
“ “ “ 15th Street.....		31 $\frac{1}{2}$
“ “ “ 72, 24th Street.....		4
“ “ “ 80-81, 33d Street.....		41 $\frac{1}{2}$
“ “ “ 42d Street.....		5

DISTANCES ON DELAWARE RIVER.

	Statute Miles.
Walnut Street Wharf to Kaighns Point.....	11¼
“ “ “ “ Greenwich Point.....	3
“ “ “ “ Girard Point.....	8
“ “ “ “ Point Breeze Oil Works.....	10.30
“ “ “ “ Chester	16.38
“ “ “ “ Schooner Ledge.....	18.25
“ “ “ “ Marcus Hook.....	19.50
“ “ “ “ Cherry Island Flats.....	26.50
“ “ “ “ Wilmington	28.00
“ “ “ “ Deep Water Point.....	29.00
“ “ “ “ New Castle.....	33.60
“ “ “ “ Fort Delaware.....	38.40
“ “ “ “ Reedy Island.....	44.00
“ “ “ “ Listons Point.....	51.00
“ “ “ “ Bombay Hook.....	54.60
“ “ “ “ Ship John Shoal Light.....	62.80
“ “ “ “ Cross Ledge.....	75.00
“ “ “ “ Brandywine	89.00
Cape May Light; to line crossing channel to Cape Hen- lopen Light	100.00

The distances here given are over the courses usually taken by steam vessels, between the points named.



CHAPTER XI.

LIGHT HOUSES, LIGHT SHIPS AND FOG SIGNALS.



THE early light houses of the United States were built and maintained by the several States in which they were situated, prior to the adoption of the Federal Constitution. The United States, in 1790, accepted the cession from the several States of the sites and buildings of the light houses then on the coasts, with their title, of which there were then eight in all. They were located at Portsmouth, N. H., Boston Light, on Little Brewster Island; Gurnet Light, near Plymouth, Mass.; Brant Point Light, on Nantucket Island; Beaver Tail Light, entrance to Narragansett Bay; Sandy Hook Light, entrance to New York Bay; Cape Henlopen Light, on Delaware Bay; and Charleston Main Light, at Charleston Harbor, S. C. In 1799, New York State ceded Montauk Point Light. These light houses were originally low structures of wood or stone, and were lighted by tallow candles. The Argand lamp was introduced in our light houses in 1812, the government having purchased the right to use the patent; and the Fresnel lens system was generally adopted in 1852.

By 1815 the number of lights had been largely increased, so as to include the following: Portland Head Light, tower of stone, 72 feet high; Portsmouth, Newcastle Island; Newburyport, Plumb Island, 2 lights; Annis Squam, Ipswich Bay, wood building, 40 feet high; Cape Ann, Thatcher's Island; Boston Light, Brewster Island, 65 feet high; Scituate Light, Cedar Point; Plymouth, two on Gurnet Head; Cape Cod Harbor, Race Point; Chatham Harbor, James Head, 2 lights; Sandy Point and Brant Point, on Nantucket Island; Gay Head and Cape Poge, on Martha's Vineyard, Point Judith, of wood, 37 feet high; Beaver Tail Light, of wood, 50 feet high; Watch Hill Light, Little Gull Light, New London Light, Faulkners

Island Light, built in 1803; Saybrook Light, Eaton's Neck Light, of wood, 50 feet high; Sands Point Light, built in 1809, of stone, 86 feet high; Montauk Point Light, Sandy Hook Light, Cape Henlopen, of stone, 115 feet high; Cape Henry Light, Old Point Comfort Light, Smith's Point Light, on the Potomac River; Cape Hatteras Light, Cape Fear Light, Cape Lookout Light, Charleston Light, house of brick, 90 feet high; Tybee Island Light, 80 feet high; St. Simon Light.

About the first light ships we find are two that were built at New York, one in 1823, for Carysfort Reef, off the Florida coast, and one in 1824, for Cape Hatteras. This latter vessel was over 300 tons, and fitted with two lights, one 60 feet and one 45 feet above the deck of the vessel. Was placed on her station in June, 1824, but in the early Fall of the year, was found adrift off the Capes of the James River, her ground tackle proving too light.

In 1830 there were sixteen light vessels on the Atlantic coast, all but two of them being located between New York Harbor and Savannah River; and in 1837 there were 26 light ships, and in 1842 there were 30 light ships on the Atlantic coast, but 5 of which stations are now supplied with a light vessel, the others having had a light house erected near the locality. By an Act of Congress of 1854, all light ships were required to be fitted with fog bells of 1,000 lbs. weight, and two cannons, but in 1859 a further change was made, substituting the fog horn for the cannon, but retaining the bell. Two or three of the iron-hull steamers of the Coast Survey Bureau having been laid aside, the machinery was removed and the hulls fitted for light vessels and sent to the Southern coast, about 1850.

The light at Christiana Creek, Delaware, in 1844, was lighted by gas made on the premises from common resin in retorts similar to those for coal gas. The next year the light at Reedy Island, on the Delaware River, was lighted by the same means. The use of resin to make illuminating gas was the practise of some of the large gas companies in this country prior to 1835, but had been abandoned on account of the varying power of its illumination. About 1845 there were experiments made for a water and resin gas, and it may have been from these experiments that the gas was placed on trial

at these light houses. It, not proving a success, was abandoned after a long trial. There was a further trial made at Reedy Island in 1857. Natural gas was experimented with in 1844, at the Portland Light, on Lake Erie. This gas was conveyed through pipes a distance of two miles to the light tower; but a great difficulty in its use was found in the collection of water in the pipes, that prevented the free flow of the gas to the lamps.

The light-house service was reorganized in accordance with an Act of Congress, approved August 31, 1852, with a Board similar to the present organization.

The first improvement in the fog signal was its operation by power. Its blast was made by a whistle, as well as a fog horn, for both were erected by C. L. Daboll, of New London, Conn., at Beaver Tail Light, in Narragansett Bay, in June, 1851, for the Light-House Board, he having been experimenting for an improved fog signal by direction of the Bureau. The instrument was operated by compressed air of 40 lbs. pressure, obtained through two air pumps driven by horse power. Three similar machines were subsequently erected at Execution Rocks Light, Little Gull Light, and on Bartlett's Reef Light vessel, the latter being operated by hand power. This latter machine consisted of a cylindrical reservoir, or receiver, in the head of which were two air pumps, operated by a shaft that was set in a frame fastened on top of the receiver. On the outer ends of the shaft were the cranks for the hand-power. Just inside the crank on one side was the fly-wheel. The whistle was located on the outer edge of the head of the receiver, and was operated by a handle just above the whistle. The trumpet had a reed in the small end. The horse-power machine was similar, but the shaft was operated through a tread-mill.

It was found, after considerable experience, that the weak point in its application was that the power was insufficient at times to maintain the proper air-pressure to operate the whistle, or fog horn, at frequent intervals. It was also considered to be too costly in its operation. As neither horse-power nor hand-power had met the requirements for blowing the fog signal, the inventor sought for a cheap and easily produced power. Steam could be used, but water for the

boiler could not always be obtained in the exposed situations of a light house; besides, it required more skilled labor than usually to be found at light stations at that period. It was thought to be too expensive for such a purpose. Such a power as was desired was at hand at the time, but not in the shape to be used for this purpose. John Ericsson had been experimenting with hot air for power purposes for some years, but it was not until 1853 that the "Ericsson" was built and fitted with hot-air engines, and by 1855, small hot-air engines were to be obtained, and it was this type of engine that C. L. Daboll used to operate one of his fog trumpets, in May, 1855, at New London Light Station, it being sounded once a minute, with a duration of 3 seconds. The hot-air engine did prove under practice to be a great improvement, but it had many weak points that it took several years to overcome. This trumpet was still in service in 1864. A patent was granted C. L. Daboll for the fog trumpet, June 26, 1860, and to him belongs the credit for its application to fog signals. Prior to these improvements, bells, rung by hand, were the universal fog signals. In 1856, the experiment was tried on the Pacific coast of using a 24-pound gun to fire during a spell of fog. A small gun was also used on the east coast of Maine during a fog at West Quoddy Head, for the Boston and St. Johns steamers.

The loss of the S. S. "Arctic," of the Collins line, in 1854, probably did more than any one other occasion to bring the question of an efficient fog signal before the public, for the subject was much discussed and engaged the close attention of those directly interested, but mainly with regard to the best means that one vessel had to advise another in the same locality of her situation by some phonetic signal. It also brought forward the question of the usefulness of the steam whistle on land as a fog signal. The successful application of one would help the other situation.

As early as 1855 there were *iron* bell boats in service. These were about thirty feet long, and fitted with a bell of 500 pounds weight, that was elevated about fifteen feet on a frame built in the vessel, and the bell rung by the motion of the sea, imparted to the vessel. These bell boats were used at the mouth of San Francisco harbor, Alden's Rock,

at Portland, Maine, harbor, and at the mouth of Boston harbor. By 1858, the number in service had increased to ten or more. The next year the Board gave up the use of these bell boats, for there were so many that were seriously injured from collisions through other vessels, and sunk, or broke loose from their moorings, that they considered them too costly a beacon for the purpose, and decided to substitute the bell buoy. They also found in the high latitudes that they collected the spray in cold weather to such an extent, in the shape of ice, as to founder in several cases.

The first *steam* fog whistle and machinery was constructed by Murry and Hazelhurst, of Baltimore, Md., in April, 1857, and erected at Beaver Tail Light Station in Narragansett Bay in the latter part of that year. Owing to the lack of fresh water and other causes, the latter probably being want of skill in operation on the part of the attendants, it did little service. It was replaced in 1865 or 1866 by a caloric engine. There were some members of the Light-House Board at the time of the erection of this whistle who thought fog signals were of little importance, since the mariner should know his locality by the character of his soundings, or should not venture near the coast until the fog was dissipated.

During the period covering the time of the Civil War, little was done in the development of the light-house service; for many of the lights on the coast below the James River had been destroyed and others had gone out of use, so that the service was only active on part of the Atlantic coast and Gulf of Mexico, and on the Pacific coast. Congress made an appropriation in 1860 authorizing the Light-House Board to make experiments with "Daboll's trumpet and other ear signals," but nothing was done until some time later. It was not until after the close of the military operations that we find officers detailed to the service who began to take the preliminary steps toward any improvement, though we find in the summer of 1864 a whistle operated by a caloric engine at Cape Ann, as well as a Daboll trumpet, that was blown through the same agency, that was located at Ports-des-Morts, Pilot Island, Lake Michigan. The first action then taken in the matter of fog signals was the further use of the Daboll trumpet at West Quoddy Head, in Maine, this instrument

being operated from August 15, 1866, through the agency of a Roper hot-air engine.

There now began a series of experiments that extended over several years, with different types of signals, and changing them in some cases where they did not prove efficient to other of the more exposed stations, to find what type of signal was best adapted to the situation. By this means a great deal of practical knowledge was acquired that proved of service in later experiments.

There was a Daboll trumpet located at Thatcher Island, Cape Ann, in the early part of 1867, but an 8-inch steam whistle was substituted on August 28, 1867. This was removed for a Daboll trumpet in June, 1869, and in August, 1871, the steam whistle was again doing duty at this station. A trumpet was also installed at Point Judith Station on June 1, 1867, being driven by a Roper hot-air engine. The Pacific Mail Steamship Company erected a trumpet operated by a caloric engine at the southern point of the entrance to San Francisco Harbor, California, in March, 1867.

It was during October, 1867, that experiments were made at Sandy Hook, N. J., by Prof. Joseph Henry and other officers of the Light-House Board, to compare different instruments, and to examine the efficiency of the siren, then a new signal. This instrument had been experimented with by Felix Brown, of New York City, who had obtained a patent upon its use on July 23, 1867. It was originally invented by Cagniard de Latour, and was well known as a means of comparing sounds and measuring the number of vibrations in different musical notes. It was operated with a steam pressure of 50 pounds to 100 pounds to the square inch. A trumpet was part of the fixture of the instrument. An 8-inch locomotive whistle was also used, as well as a first-class Daboll trumpet, operated by an Ericsson hot-air engine, under an air-pressure of from 15 to 30 pounds. The result of these experiments was the adoption of the reed trumpet, the whistle, and the siren for the more important stations.

It is found subsequent to these trials that the steam whistle was brought into more general use. At Point Judith Station the trumpet was removed for a steam whistle in September, 1868. A 10-inch steam whistle was located at Cape

Elizabeth Station, Portland, Maine, on June 15, 1869. This instrument consisted of a locomotive boiler, with the whistle and attachments on the dome of the boiler, and was constructed by Charles Staples & Sons, machinists, of Portland. This whistle was heard 5 miles to the windward during heavy weather, and 11 miles in moderate weather. On August 3, 1869, a steam whistle was first put in operation in place of a trumpet at West Quoddy Head Station, and at Whitehead Light Station, at the entrance to Penobscot River, a whistle was substituted for the fog bell, November 17, 1869. During the winter of 1869, the power at Beaver Tail Light was changed to steam.

Some of the early improvements were:

WHISTLE.

Martinicus Rock Light Station.....	July 7, 1870
Pigeon Point Light—California.....	Sept. 10. 1871
Pass O l'Outree Light—Mississippi River.....	Aug. 15, 1872
South-West Pass Light—Mississippi River....	Aug. 15, 1872
Seguin Light Station—Kennebec River.....	Aug. 28, 1872
Point Conception—California.....	Sept. 26, 1872
Race Point Light Station 12"—Cape Cod, Mass.	June 20, 1873

DABOLL TRUMPET.

Cape Ann Light—Thatcher's Island.....	June 30, 1869
Execution Rock Light—Long Island Sound....	Jan'y 25, 1869
Manana Island—Monhegan Light Station.....	April 4, 1870
Boston Light—Boston, Mass.....	Oct. 29, 1871
Portland Head Light—Portland, Me.....	Nov., 1871
Montauk Point Light—Long Island.....	May 1, 1873
Highland Light—Cape Cod.....	June 23, 1873

SIREN.

East Beacon Light—Sandy Hook, N. J.....	March 31, 1868
Little Gull Light—Long Island Sound.....	Dec. 15, 1869
Eatons Neck Light—Long Island Sound.....	July, 1871
Point Judith Light—Rhode Island.....	May 1, 1873

The United States government at a very early date saw the importance of a further improvement in fog signals as aids to navigation. About 1850, when the California gold

fever began in earnest, and the Collins line began operations, our coastwise commerce and our inland marine increased so rapidly that it became necessary that something far in advance of the old system for the safety of vessels should be obtained and made use of. In 1855 the Light-House Board had Prof. J. H. Alexander, of Baltimore, Md., make investigations, especially of the use of the locomotive whistle as a fog signal, with several experiments with the instrument. It was not until October, 1865, that the further investigation of the subject was taken, when at New Haven, Conn., steam whistles, bells, steam gong or double whistle, and the trumpet were put to extended tests, the penetrating power of the different instruments being carefully compared. Again, in 1867, at Sandy Hook, N. J., trials were made as before referred to. A very thorough investigation through a long series of experiments was carried forward at Portland, Maine, in 1871, by General J. C. Duane, then the engineer officer in charge of the First and Second Light House District, and one who was well qualified for the duty from his well-known scientific ability. It was from these experiments that dates the first stage of the expansion of our fog-signal system. While all the conclusions arrived at were not generally accepted, still it served as a most firm basis to build on. Further extended trials were made in August, 1873, under Prof. Henry, who was the scientific adviser of the Light-House Board and in charge of the experiments, with Commander J. G. Walker—the present Rear Admiral—then Naval Secretary of the Board. These were carried out on the Maine coast, and an opportunity there presented itself to examine the question of the “silent area” from the blast of the fog signal, though no conclusion was then arrived at. This was again inquired into during the experiments of 1874, on Long Island Sound. The later experiments include those conducted at the time of the loss of the “Rhode Island” in Narragansett Bay, in 1880, and in the fall of 1893, Prof. Hazen and Dr. White, and Mr. A. B. Johnson, Chief Clerk of the Light-House Board, who has scientific ability of no low order, conducted a series of experiments especially to investigate the phenomenon of “ghosts” or silent areas near a fog signal. It will thus be seen that the government has ever had before them the improvement of the fog-signal ser-

vice, and while they may not have solved the question of the silent area, still they have increased the number of signals to such an extent that at this time they have over 180 in service that are operated by steam, caloric, or oil engines.

The steam fog whistle was first introduced on our light vessels in 1875, on Light Ships No. 39 and No. 40. The siren, driven by hot-air engine, was introduced in 1876, on Light Ship No. 41.

Hell Gate electric light was first exhibited October 20, 1884, and discontinued December 1, 1886.

The first light-house tender on the Pacific coast was the "Schubrick," built in Philadelphia, Pa., and left for the Pacific coast in January, 1859, under command of Capt. John De Camp.

The automatic whistling buoy was invented in 1876 by J. M. Courtney, of Cornwall, N. Y., who had been a commander of steam vessels on the Atlantic coast. The Light-House Board took one on trial in February, 1876, placed it in the lower part of New York Bay, and during the next August placed one off Fire Island Light Station, Long Island, and the next month placed two on the coast of Maine.

A few results from the investigations made by the Light-House Board where the "silent area" surrounding a fog signal has been developed may be of interest, with some conclusions drawn from the data obtained at the time.

General Duane, in his report of experiments made on the coast of Maine, in 1871, says in part:

"There are six steam fog signals on the coast of Maine; these have been frequently heard at a distance of twenty miles, and as frequently cannot be heard at the distance of two miles, and this with no perceptible difference in the state of the atmosphere. The signal is often heard at a great distance in one direction, while in another it will be scarcely audible at the distance of a mile. This is not the effect of wind, as the signal is frequently heard much farther against the wind than with it. For example, the whistle on Cape Elizabeth can always be distinctly heard in Portland, a distance of nine miles, during a heavy northeast snow storm, the wind blowing a gale directly from Portland toward the whistle.

"The most perplexing difficulty, however, arises from the fact that the signal often appears to be surrounded by a belt, varying in radius from one to one and a half miles, from which the sound appears to be entirely absent. Thus, in moving directly from a station, the sound is audible for the distance of a mile, is then lost for about the same distance, after which it is again distinctly heard for a long time. This action is common to all ear signals, and has been at times observed at all the stations, at one of which the signal is situated on a bare rock twenty miles from the mainland, with no surrounding objects to affect the sound."

Prof. Henry and Commander J. G. Walker, U. S. N., left Portland, Me., August 12, 1873, in the tender "Myrtle," for Whitehead Light Station, at which place abnormal phenomena of sound had been observed. "Whitehead Light Station is on a small island about a mile and a half from the coast of Maine, on the western side of the entrance to Penobscot Bay, and in the direct line of the coasting steamers and other vessels from the westward bound into the Penobscot Bay and River. The light house and fog signal are situated on the south-east slope of the island, the surface of which consists almost entirely of rock, the middle being an elevation of 75 feet above the mean tide level.

"The phenomena which had been observed at this and other stations along the coast consisted of great variation of intensity of sound, while approaching and receding from the station. As an example of this, we may state the experience of the observers on board the steamer "City of Richmond" on one occasion, during a thick fog in the night in 1872. The vessel was approaching Whitehead from the southwestward, when, at a distance of about six miles from the station, the fog signal, which is a 10-inch steam whistle, was distinctly perceived and continued to be heard with increasing intensity of sound until within about three miles, when the sound suddenly ceased to be heard, and was not perceived again until the vessel approached within a quarter of a mile of the station, although from conclusive evidence, furnished by the keeper, it was shown that the signal had been sounding during the whole time. The wind during this time was from the south,

or approximately in an opposite direction to the sound. Another fact connected with this occurrence was that the keeper on the island distinctly heard the whistle of the steamer, which was commenced to be blown as soon as the whistle at the station ceased to be heard, in order to call the attention of the keeper to what was supposed to be a neglect of his duty in intermitting the operations of his signal. It should be observed in this case that the sound from the steamer was produced by a 6-inch whistle, while that of the station was from an instrument of the same kind of 10 inches in diameter; or, in other words, a lesser sound was heard from the steamer, while a sound of greater volume was unheard in an opposite direction from the station. It is evident that this result could not be due to any mottled condition or want of acoustic transparency of the atmosphere, since this would absorb the sound equally in both directions. The only plausible explanation of this phenomenon is that which refers it to the action of the wind. In the case of the sound from the steamer, the wind was favorable for its transmission, and hence it is not strange that its sound should be heard on the island when the sound from the other instrument could not be heard on the steamer. To explain on the same principle the fact of the hearing of the sound at the distance of six miles, and afterwards of losing it at the distance of three miles, we have only to suppose that in the first instance the retarding effect of the wind was small, and that in the second it became much greater on account of a sudden increase in the relative velocity of the current in the upper and lower portions.

“After making a critical examination of the island and the position of the machinery, and also in regard to any obstacle which might interfere with the propagation of the sound, the keeper was directed to put the instrument in operation and to continue to sound it for at least two hours, or until the steamer was lost sight of, which direction was complied with. In passing from the island almost directly against a light wind, the intensity of the sound gradually diminished as a whole with the increase of distance, but varied in loudness from blast to blast, now louder, then again more feeble, until it finally ceased at a distance of about fifteen miles, as estimated by the intervals between the blasts and the sight of

the steam as seen through a spy-glass, and also from points on the Coast Survey charts.

"The result of this investigation clearly showed the power of the apparatus in propagating sound under conditions not entirely favorable, since the wind, though light, was in opposition to the sound."

In some investigations held during the same month in the vicinity of Cape Elizabeth Light Station, at Portland, Maine, it was found: "During the foregoing experiments, when the vessel was about a mile from the station, steaming directly outward in the prolongation of the axis of the instrument, there was heard after each sound of the whistle a distinct echo from the broad, unobstructed ocean, which was attributed at the time, as in other cases, to reflections from the crests and hollows of the waves, a similar phenomenon having since been referred to a reflection from air of a different density. This observation becomes important in regard to the solution of the question as to the abnormal phenomena of sound." This course of experiments covered those made at Cape Ann Light, as well as at Boston Light Station.

In August, 1874, observations were made at Little Gull Island Light Station, in Long Island Sound, from the light-house tender "Putnam." "At this place are two sirens, the one to replace the other in case of an accident. One of the sirens was sounded with a pressure of 50 pounds per square inch. The wind was across the axis of the trumpet, and almost precisely at right angles to it.

"The steamer was headed against the wind, on a line at right angles to the axis of the trumpet. The sound in this case also traveled against the wind, which was at an estimated velocity of from 4 to 5 miles per hour. The distance traveled before the sound became inaudible was estimated by the speed of the steamer at $3\frac{1}{2}$ miles.

"The steamer was next headed in an opposite direction and returned along its previous path, across the mouth of the trumpet of the siren, the sound gradually increasing in strength without any marked irregularity, until the siren was reached, and on leaving this, the course remaining the same, the sound gradually diminished in intensity, but with less rapidity than before, until it was finally lost at a distance of

7½ miles. In the latter instance the movement of the sound was with the wind. The result of these observations was conformable to that generally obtained from previous observations, namely, that the sound is seldom or never heard at the same distance in different directions, and, moreover, that it is generally heard farther with the wind than against it.

"The observations of this day also illustrate the spread of the sound wave on either side of the axis of the trumpet, a fact which has frequently been observed in other investigations. It may be well to mention that the siren trumpet at this locality is directed horizontally, with its prolonged axis passing over, immediately in front of the mouth of the trumpet, a space of very rough ground, the surface of which is principally composed of bowlders, one of which, of very large size, is directly in front of the trumpet, and the idea occurred that this rough surface might produce some effect on the transmission of sound to a distance. I observed by strewing sand upon a paper that the former was violently agitated when held near the surface of the large boulder just mentioned during the blast of the siren trumpet.

"At this station, during the visit of Sir Frederick Arrow, the sound was lost in the direction of the axis of the trumpet at a distance of two miles, and then again regained with distinctness at the light vessel, a distance of four and one-half miles. This was what we have denominated as an abnormal phenomenon, which we think was due to a slight variation in the velocity of the lower or upper part of the current of air, but, unfortunately, the demand for the use of the vessel as a light-house tender prevented the attempt to ascertain whether the same phenomenon would be observed a second time and to further investigate its cause."

Some days later than the previous investigations, while making observations at Block Island, the ocean echo received their attention. "This occasion also furnished very favorable conditions for observing the remarkable phenomenon of the ocean echo. At the cessation of each blast of the trumpet, after a slight interval, a distinct and prolonged echo was returned from the unobstructed ocean. It is important to observe in regard to this phenomenon that the siren is placed near the edge of a perpendicular cliff, at an elevation of from

75 to 100 feet above the ocean, and, furthermore, that the direction of the wind formed an angle of about 35° with the axis of the trumpet. Now, the loudness of this echo was not the greatest at the siren house, but increased in intensity until a point was reached several hundred yards from the trumpet, approximately more in accordance with a reflection from the waves. The wind was blowing from the shore with the direction of the sound, as it went off from the trumpet, and nearly against it on the return of the echo. I have attributed this phenomenon, which was first observed in 1866 at East Quoddy Head, on the coast of Maine, and since at various stations at which the trumpet or siren has been used, to the reflection of the sound from the crests and slopes of the waves, and the observation we have mentioned would appear to favor this hypothesis."

In 1875 there were a few weeks given to investigations, and Little Gull Light Station was the scene of further observations during the month of September, and covering a period of six days. The report says: "The object of these investigations was to obtain facts which might serve to establish the true theory of the abnormal phenomena of sound, an object, independent of its scientific interest, of much practical importance in its application to fog signals. Although the observations were not as perfect as we could wish in many respects, from want of certain appliances, they are yet sufficient, we think, to establish principles of much practical value. For example, if the mariner, in approaching a fog signal while the wind is blowing against the sound, fails to perceive it on deck, he will probably hear it by ascending to the masthead; or, in case a sound from a given station is constantly obscured in a certain direction while it is audible in adjacent directions, we may attribute it to a sound shadow produced by some interposing object. If again, the obscuration of sound in a given direction is only observed during a wind moving against the sound, the cause will probably be found in a lateral refraction due to the retardation of the current of wind against a perpendicular wall or cliff. The subject, however, is one of great complexity, and requires further investigation, but the results thus far obtained may be considered as furnishing the preliminary data on which to found more precise observations."

Beaver Tail Fog Signal.—“This fog signal is on the point of that name which separates the East Passage from the West Passage, both leading from the Atlantic Ocean to Narragansett Bay. The open ocean lies to the south. The island on which Newport is situated is about half a mile to the east. The land on which the rival watering place, called Narragansett Pier, is located, is about a mile to the west. Both shores have many and deep indentations. The great Sound steamers go either to the eastward or westward as they may be bound to Newport and Fall River, or Providence, and in the fog they are guided to a certain extent by the steam whistle, which is the fog signal at Beaver Tail Point. One of these steamers, the ‘Rhode Island,’ in attempting the west passage on the night of November 6, 1880, ran ashore on Bonnet Point, about $1\frac{1}{2}$ miles northwest from Beaver Tail. The fog was dense and there was little if any wind. The newspapers stated that the officers and several passengers swore that the fog signal at Beaver Tail was not sounding at the time. Subsequent investigation made at the instance of the Light-House Board, by Lieut.-Com. Chadwick, U. S. N., showed that the fog signal *was* sounding, and that it was heard several miles away in several directions. Soon after, I had another opportunity to further observe the operations of this signal. We left Narragansett Pier, Rhode Island, on August 6, 1881, at 4 P. M., in a dense fog, with a strong breeze from the W.S.W. and a heavy chop sea. We wished to ascertain how far the Beaver Tail fog signal could be heard dead to windward and in the heaviest of fogs. At Whale Rock, $1\frac{1}{3}$ miles from it, we did not hear a trace of it. Then the steamer was headed directly for Beaver Tail Point, and we ran slowly for it by compass until the pilot stopped the steamer, declaring we were almost aboard of the signal itself. Every one strained his ears to hear the signal, but without success, and we had begun to doubt of our position when, the fog lifting slightly, we saw the breakers in altogether too close proximity for comfort. We passed the point as closely as was safe, and when abreast of it and at right angles with the direction of the wind, the sound of the fog signal broke on us suddenly and with its full power. We then ran down the wind to Newport and carried the sound with us all the way. The fog continuing during the next day, the signal kept up its

sound, and we heard it distinctly and continuously at our wharf, though five miles distant."

On the night of May 12th, 1881, about midnight, the "Galatea," a propeller of the New York and Providence line, bound through Long Island Sound from Providence, was grounded in a dead calm and a dense fog on Little Gull Island, about one-eighth of a mile from and behind the fog signal, and got off two days later without damage. "It was, as usual, alleged that the fog signal, a steam siren, at Little Gull Light, was not in operation at the time of the accident, and the Light-House Board immediately ordered an investigation. This was made by the assistant inspector of the lighthouse district, a naval officer, who reported that after taking the sworn evidence of the light keepers at Little Gull and the other light stations within hearing distance, of other government officers who were for the time being so located that they might have had knowledge of the facts, and of the officers of vessels that were within ear-shot, including those of the "Galatea," he reached the conclusion that the fog signal was sounding at the time of the accident; and that, although the fog signal was heard at Mystic, 15 miles distant in another direction, and although it was heard on a steam tug a mile beyond the "Galatea," that it was heard faintly, if not at all, on that vessel; and if heard at all, was so heard as to be misleading, though the "Galatea" was but one-eighth of a mile from the source of the sound."

It appears that this officer spent several days steaming around Little Gull while the fog signal was in full blast, in various kinds of weather, and that he found the aberrations in audition here were as numerous, and even more eccentric, than those before mentioned as experienced at Beaver Tail.

Mr. A. B. Johnson, of the Light-House Service, who served as one of the committee making investigations with Professors C. A. White and H. A. Hazen, in 1890, offered for consideration to the mariner some suggestions as to the fog signal.

"It seems that the mariner should, in order to pick up the sound of the fog signal most quickly when approaching it from the windward, go aloft, and that when approaching it from the leeward the nearer he can get to the surface of the water the sooner he will hear the sound,

"It also appears that there are some things the mariner should not do.

"He should place no negative dependence on the fog signal; that is, he should not assume that he is out of hearing distance because he fails to hear its sound.

"He should not assume that because he hears a fog signal but faintly he is at a great distance from it.

"Neither should he assume that he is near to it because he hears the sound plainly. He should not assume that he has reached a given point on his course because he hears the fog signal at the same intensity that he did when formerly at that point. Neither should he assume that he has not reached this point because he fails to hear the fog signal as loudly as before or because he does not hear it at all. He should not assume that the fog signal has ceased sounding, because he fails to hear it even when within easy ear-shot.

"He should not assume that the aberrations of audibility which pertain to any one fog signal pertain to any other fog signal. He should not expect to hear a fog signal as well when the upper and lower currents of air run in different directions; that is, when his upper sails fill and his lower sails flap, nor when his lower sails fill and his upper sails flap.

"He should not expect to hear the fog signal so well when between him and it is a swiftly flowing stream, especially when the tide and wind run in opposite directions.

"He should not expect to hear it well during a time of electric disturbance.

"He should not expect to hear a fog signal well when the sound must reach him overland, as over a point or an island.

"And, when there is a bluff behind the fog signal, he should be prepared for irregular intervals in audition, such as might be produced could the sound ricochet from the trumpet as a ball would from a cannon; that is, he might hear it at 2, 4, 6, 8 and 10 miles from the signal, and lose it at 1, 3, 5, 7, 9 and 11 miles' distance, or at any other combination of distances, regular or irregular

"These deductions, some made as previously mentioned by several of the first physicists of the age, and some drawn from the original investigations here noted, are submitted for con-

sideration rather than given as directions. They are assumed as good working hypotheses for use in future investigation. While it is claimed that they are correct as to the localities in which they were made, it seems proper to say that they have not been disproved by the practical mariners who have given them some personal consideration, and who have tried to carry them into general application. Hence these suggestions have been set down in the hope that others with greater knowledge and larger leisure may give the subject fuller attention, and work out further results.

"If the law of these aberrations of audibility can be evolved and some method discovered for their correction, as the variations of the compass are corrected, then sound may be depended upon as a more definite and accurate aid to navigation. Until then, the mariner will do well when he does not get the expected sound of a fog signal, to assume that he may not hear a warning that is faithfully given, and then to heave his lead and resort to the other means used by the careful navigator to make sure of his position."*

There have been further investigations made along the same lines, the latest being those made on the coasts of Maine and Massachusetts in 1893 and 1894, by Major W. R. Livermore. His conclusions contained some suggestions covering different ground from those of Mr. Johnson, in these words:

"Mariners differ so widely in capacity that rules that would be very useful to one might be misleading to another. No definite instructions can be prepared that will insure against accidents. Even the best of seamen are often harassed by cares and duties that divert their attention for the moment, and in case of disaster the most conflicting accounts have been given of the aberrations of the audibility of fog signals.

"The noises upon a ship, the noise of the wind and waves, and the condition of the nerves all affect the audibility of fog

* There was a series of experiments conducted by the Trinity House Committee—British Light-House Board—at St. Catherines Point, in the English Channel, from May 8 to June 13, 1901, and in the very elaborate report made on the result of the tests of the instruments used, and investigation of sound from fog signals, there does not appear to have been any advance made beyond the position held by the United States Light-House Board on the question.

signals to a degree that can best be appreciated by studying the evidence. It is impossible to navigate in bad weather without more or less risk.

"Mariners should study the principles that affect the audibility of fog signals, just as they study the art of navigation, and should notice the wind and temperature whenever they hear fog signals. They should only depend upon hearing them at short range, unless the wind and weather favor the sound, but if they do hear them at long range they should make what use they can of them.

"They should remember that it does not require a very heavy wind to drive back the sound; that a southerly wind generally drives back the sound more than a northerly or an easterly one; that about the time of a change in the wind the sound is not generally heard as far as usual; that when the upper and lower currents of air run in different directions, or when the upper sails fill and the lower sails flap, or conversely, the signal is not to be depended upon; that a very heavy wind tends to break up all sound; that if a vessel is traveling with the wind, the signal will probably be heard better than if it were traveling against it; that behind a hill or an island the signal may be heard better at a distance than nearer to the obstacle; they should bear in mind that it is hard to locate a feeble sound, and even a strong one may appear to come from the wrong direction if it is obstructed by objects near it, even by objects not directly in the straight line between the observer and the signal; that neighboring cliffs and sails sometimes reflect the sound; that the sound may be cut off entirely by passing vessels; that to estimate the direction of the sound the head should be turned rapidly from side to side so that the sound may reach the ears alternately."

The question along these lines that is receiving attention just at present, is how to have a more efficient fog signal placed on sailing vessels than the old-fashioned fog horn that has been required by law for fifty years. Steam vessels certainly require more protection from sailing vessels in a fog than can be furnished by the fog horn.

STEAMBOAT INSPECTION SERVICE.

The first law in this country "to provide for the better security of the lives of passengers on board of vessels propelled in whole or in part by steam," was contained in the Act of Congress, passed July 7th, 1838. The inspectors were appointed by the district judges of the United States Courts in the several districts, and were paid the sum of five dollars by the owner of the vessel for each inspection. To show the utter worthlessness of the inspections at this date, and the formal manner in which they were carried out, the testimony, in part, of an inspector, given at a coroner's inquest, where several lives were lost by the burning of a large passenger steamboat on the Atlantic coast, will suffice.

"We never condemned any boat. We have restricted them to a certain amount of steam."

"When you inspect a boat you look at the wood and do nothing else?"

"Yes, we take our fees."

"How do you examine the hull of a vessel?"

"Why, I examine it with my eyes. I go and inquire the boat's age; I examine the hull and I look at the engine. How much do you suppose I am to do for five dollars?"

Then the inspectors give a certificate, in which they state their opinion whether the said vessel is sound and seaworthy and fit to be used for the transportation of passengers and freight and the boiler is sound and fit for use, together with its age. Then they take their fees. The hulls were to be examined every twelve months and the boilers every six months, but it is very doubtful if any were examined except by the advice of the inspector. It was a trick of the owner at times, that if a vessel prior to the time of inspection should not have the required number of small boats to pass the law, he would borrow them for the occasion and return them after his guests had examined the wood. This law required that all steamboats running between sunset and sunrise, "to carry one or more signal lights that may be seen by other boats navigating the same waters."

In an Act of Congress of March 3d, 1843, the Secretary of the Navy was to appoint a board of examiners "consisting

of three persons of thorough knowledge as to the structure and use of the steam engine," and among other duties required of them being, "and whether hydrostatic pressure, or what other plan, is best for testing the strength of boilers under the inspection laws, and what limitation as to the force or pressure of steam to the square inch, in proportion to the ascertained capacity of a boiler to resist, it would be proper to establish by law for the more certain prevention of explosions."

In the chapter of Western Rivers in this work will be found reference to a State law of Louisiana in 1834, requiring the hydrostatic pressure in the testing of steam boilers. The laws of France at this time required high-pressure boilers to be proved by hydraulic pressure to at least three times the working pressure.

The law of August 30th, 1852, was a radical departure, for while the previous law was composed of but 13 sections, the one of 1852 contained 44 sections. It was the first law of the United States under which the hydrostatic pressure was applied to marine steam boilers in testing them by the inspectors, as well as making it compulsory that all engineers and pilots of passenger steam vessels should be licensed by the local inspectors, who were designated by the Judge of the United States District Court and the Supervising Inspector of the district, and that all boiler plates were to be stamped with the quality of iron and the manufacturer's name.

The controlling body under this law was a Board of Supervising Inspectors, consisting of nine members, appointed by the President, who were "selected for their knowledge, skill and experience in the uses of steam for navigation," and was composed of Samuel Hall, of Boston, Mass., who was succeeded by William Burnett in less than a year; Charles W. Copeland, of New York City; James Murray, of Baltimore, Md.; P. H. Skipwith, of New Orleans, La.; Davis Embree, of St. Louis, Mo.; John Shallcross, of Louisville, Ky.; Benj. Crawford, of Pittsburg, Pa.; Alfred Guthrie, of Chicago, Ill.; and William Bird, of Black Rock, N. Y. This board made the original rules and regulations for the steamboat service.

This law was mainly brought into existence by the amending of the previous law, commenced in 1850, occasioned by the burning of the steamer "G. B. Griffith" on Lake Erie, on

June 16th, 1850, when 20 miles below Cleveland, Ohio, where there was a large loss of life. In the House of Representatives, on June 24th, 1850, eight days after the loss of the vessel, D. K. Carter, a member of the House from Ohio, offered the following resolution to that body:

"Resolved, That the Committee on Commerce be instructed to inquire into the expediency of providing a law compelling all craft carrying passengers and navigating the waters of the United States, or sailing under the authority of the United States, to be provided with ample and suitable resources of escape to passengers in case of accident by fire or otherwise; and further inquire into the expediency of making certain custom-house officers inspectors to carry out any law in pursuance of the purposes of this resolution; and said committee report by bill or otherwise."

Subsequently the Committee on Commerce reported a bill in compliance with this resolution, which was passed by the House of Representatives in 1851, and would undoubtedly have passed the Senate also that year, but other matters of importance were then before that legislative body. The bill, when the "Henry Clay" disaster occurred, was in that condition that it required but a short time to place it on the statute books to give it the full force of the law, and it was hurried forward in the public demand for a safety of some kind with its many omissions and errors, leaving the additions and corrections for a later date. There were some large steamboat owners in the eastern States who were much opposed to the passage of the bill, but public opinion was so strong at the time for some measure of security that Congress was compelled to pass the bill against all the pressure brought to bear to do otherwise. The bill became a law in about a month after the loss of the "Henry Clay." While the bill was in Congress, John Davis, of Massachusetts, in the Senate, and D. L. Seymour, of New York, in the House, were its main supporters. The Committee on Commerce in both Houses had the assistance on technical matters in the preparation of the bill, of Charles W. Copeland, of New York City, for the Atlantic coast, and Davis Embree, of St. Louis, Mo., representing the western river interests. It took some two months after the passage of the Act by the Congress for the selection

of the Board of Supervising Inspectors by the President, and it was well into the early part of the year 1853 before the law was in operation, for the local inspectors could not be appointed until the organization of the Board of Supervising Inspectors, in October, 1852.

The captains of the steamboats on the seaboard and eastern rivers had always navigated their vessels under an unwritten law of their own of "keeping to the right, as the law directs," and with the stem and stern lights in clear weather could well make out the position and maneuvers of another steam vessel navigating the same waters. There were a few of the seaboard States, prior to the law of 1852, that made a law governing the piloting of steam vessels within their own States.

Before the restrictions were placed upon them, the operation of steam vessels on the rivers and coast had been at the discretion of the captain and engineer, the latter carrying such a pressure of steam as he thought advisable, or those in authority over him gave orders to carry, without any government supervision, but governed by circumstances surrounding them. It might be expected that when a law prescribed limits for the officers to work within, after being allowed such liberty of action as they had possessed before the law of 1852 was put in force, that there would be murmuring and opposition to its enforcement. Some of the opposition to this new law from the engineers came from the expectation that in their examinations for a license the applicants would be questioned both on the theory as well as in the practice of the steam engine, and as the larger number had received their promotions for their practical years of service, and as the theoretical side of the steam engine had not become in a very large measure a part of the practical engineer's life at that time, they had grave doubts of the successful execution of the law. They found during their examination for a license that the theory of the steam engine cut but a small figure, but practical experience, attention to their duties and a good moral character had much to do with their passing a successful examination.

The first Annual Report of the Supervising Inspectors, made November 19th, 1853, says, regarding the operation of the

law for the first year: "When the law first went into effect it met great opposition, not only from many persons interested as owners in steamboats, but also from many of the engineers and pilots, persons who, in our opinion, are more highly benefited in a pecuniary and social point of view than any other, as the effect must be not only constantly to maintain a high rate of wages to those holding licenses under the law, but also to elevate materially their social position. This opposition to the law has decreased rapidly, and many of those formerly arrayed in the ranks of the enemies are now numbered among its strongest friends.

"It is also worthy of note that it is found that insurance companies are far more ready to take risks upon those steamers that have been inspected under the law, than upon others.

"The beneficial effect of the law is also shown in the returning confidence of the traveling public in this mode of conveyance. Finally, we would state as our unanimous opinion that the greater the experience had in the operation of the law the greater will become the number of its friends and the less the opposition to its enforcement, and not only so, but the wisdom of Congress in enacting this law will become more and more apparent."

Under the new law each engineer and pilot was required to pay for the first certificate granted by the local inspectors five dollars, and for renewals one dollar each.

About the first rule made by the board was that for the government of pilots upon the Atlantic coast and the lakes, on October 30th, 1852, and contained the following provisions:

"All pilots of steamers navigating seas, gulfs, lakes, bays or rivers (except rivers emptying into the Gulf of Mexico, or their tributaries), when meeting or passing each other shall, as they approach each other, observe the following regulations:

"Rule 1. The pilot of a descending vessel, if in a narrow river or channel, shall check her engine, using only so much steam as shall be necessary to keep her steerage, and if no signal is given each shall pass to the right or on the larboard side of the other; but if this mode of passing shall be deemed unsafe by the pilot of either vessel, the pilot objecting to it

shall give reasonable notice by a distinct and strong stroke of the bell, repeating the same if necessary at short but distinct intervals, while the other shall answer as soon as heard by a similar stroke of the bell, and they shall each pass to the left instead of the right. But if a passage by each other is unsafe, or impracticable by the reason of the narrowness of the channel, or from other cause, the pilot of the vessel the first in such channel, shall ring her bell rapidly, and the other, if not already in the channel, shall give way and let her pass; but if both are in the channel, the ascending vessel shall give way to the descending vessel, and no vessel shall be justified coming into collision with another if it be possible to avoid it.

“Rule 2. Should the pilot of either vessel fail to make; or to answer the signals prescribed, or should a signal be answered erroneously, both vessels shall be immediately stopped. When a vessel is running in a fog it shall be the duty of the pilot to cause a bell to be struck, or the steam whistle to be sounded every two minutes. This rule shall be observed by all pilots in all seas, gulfs, lakes, bays and rivers.”

The pilot rules for the western rivers were made to conform to the practise then existing on those waters, as it was thought inadvisable to change or revise them, owing to the peculiarity of the navigation of the western rivers.

Regarding signal lights, a few weeks later a rule was made that steamers must carry a bright white light on the stem, or near the bow, and another on the mast near the stern.

The engineers and pilots under this law were the only officers that were licensed, and were held responsible for the safe navigation of the vessel. The master was looked upon as being the representative of the owner on board, and was liable, with the latter, in any neglect of the law on their part in the fitting of the vessel, and for damages in case of loss of life or property on the vessel.

This new law created an inflamed condition of the old feeling between the engineers and captains, by giving such prominence to the engineers (and pilots), which was more than had been accorded them since the days of Fulton. Two sections of the law will suffice to show how the duties of these officers were viewed under the law as licensed officers:

Section 9, part 15, said: "That it shall at all times be the duty of all engineers and pilots licensed under this act, and all mates, to assist the inspectors in the examination of any such vessels to which any such engineer, mate, or pilot, belongs, and to point out all defects and imperfections in the hull or apparatus for steaming, and also to make known to them at the earliest opportunity all accidents occasioning serious injury to the vessel or her equipment, whereby life may be in danger; and in default thereof the license of any such engineer or pilot shall be revoked."

Section 28. "And be it further enacted, That on all such steamers navigating rivers only, when from darkness, fog, or other cause, the pilot on watch shall be of opinion that the navigation is unsafe, or from accident to or derangement of the machinery of the boat, the engineer on watch shall be of the opinion that the further navigation of the vessel is unsafe, the vessel shall be brought to anchor or moored as soon as it prudently can be done; provided, That if the person in command shall, after being so admonished by either of such officers, elect to pursue such voyage, he may do the same; but in such case he and the owners of such steamer shall be answerable for all damages which shall arise to the person of any passenger and his baggage from said causes in so pursuing the voyage, and no degree of care or diligence shall in such case be held to justify or excuse the person in command, or said owners."

In the early days the engineer had always endeavored to uphold the importance of the steam department of the vessel, but the captain assured him that the safety of the vessel was placed in his hands, and that he was responsible for the *entire vessel* and its cargo. That is right as far as it goes. This law brought about the feud between the heads of the engineering and deck departments that lasted for so many years, until after the captains became licensed officers, and was at times the cause of much concern to the owners of steam vessels. Thanks to the development of a better feeling, it has been met of late years by a recognition of mutual interests on both sides, where all concerned are working for the same results. It must be admitted that the higher technical education of the marine engineer in the last thirty years has given him a

standing in marine circles that the commander cannot refuse him. There has been no one instance in late years to show the value of the modern marine engineer as the run of the battleship "Oregon" from San Francisco to Cuban waters during the Spanish-American war of 1898. It is recognized that they are not all Milligans in the merchant service as engineers, nor are they all Clarks as commanders. Some of the early engineers in the Navy Department from the merchant service remained but a short time.

When the Board of Supervising Inspectors began their duties under the law, to make rules and regulations for the government of licensed officers of steam vessels, they found they had no easy task, but many of them being men of experience in their profession, they knew that radical changes in the law governing the operations of steam vessels would be not to the interest of the officers of the vessel, nor to the owners, so the first rules made were those regarding the pilots, and the signal lights, which were mainly those that had been in operation on steam vessels for many years. There were some changes made at a later date. There were also rules regarding fire pumps, life preservers and life-saving apparatus. The classifying of the engineers on the seaboard and the lakes was also made. This was the principal ground covered in the first year, though by no means the extent of their labors. This board had on its hands the making of the rules for the guidance of the local inspectors of the several districts, and as there was no maritime power that had their steam navigation similar to our own, with so much internal navigation mainly, that they could refer to for results, the board were compelled to rely upon their own judgment and experience in the making of their rules. One thing that gave them much concern for the first few years was the want of uniformity in the interpretation of the rules by the local inspectors of the several districts. This was overcome after a time. It will thus be seen that it required much time and labor to get the law into anything like working order; especially where the whole executive as well as administrative force were new to the situation.

There was a great advance made in the inspection service when all marine steam boilers were subjected to the hydro-

static test. This was not original with the board. The results obtained were in some cases a surprise to the inspectors, especially the weakness developed in the bracing of the steam chimneys and as well as the furnaces. It was a school of education for the engineers of the board. In their Annual Report of 1855 they refer to this subject and say: "Aside from those benefits arising from the operation of the steamboat law which are open and patent to the public, cases frequently come to the knowledge of the inspectors in the performance of their duties which show forth the benefits still more strongly. These cases are mainly where defects are brought to light by the process of inspection and proving of boilers, which otherwise would not have been discovered except by the occurrence of some serious accident, which having occurred, the cause cannot possibly be ascertained, and always remains a mystery. As exhibiting the benefits arising from the operation of the law in this particular, we cite the following cases among those which have occurred." These are but a part of the report on the subject.

"In the First Supervising District on one occasion, two flues of a new boiler were collapsed while being submitted to the hydrostatic test at a pressure little above that which was intended to be carried when in use. On another occasion, on applying the hydrostatic test, seven of the stays upon the furnace were broken and the crown of the furnace collapsed. And in a third case, upon a similar application of the test, the crown of the furnace was collapsed and the sides crippled, so that an entire new furnace was required to be put in. Many other similar cases of minor importance have occurred in this district.

"In the Second Supervising District on one occasion, upon the application of the hydrostatic test to a boiler, two of the flues were collapsed at a pressure much below that at which it was intended to be used. On another occasion, upon applying the test, the manhole plate was burst and the boiler started at the manhole opening. On still another occasion a portion of the steam chimney was collapsed. On another, the application of the test ruptured the steam pipe. A case presenting negative evidence of the value of inspection occurred in this district, where an application was made to the

local board to inspect a steamer. They commenced the inspection, and required certain repairs to be made to the boiler, which the owners refused to make, and declined to have the inspection completed, preferring to forego the carrying of passengers. They went on their route, and on their first trip the boiler burst and one or two of the crew were killed. One case of an extraordinary character occurred in this district. The steamer referred to went upon a trial trip, and during the trip carried a maximum pressure of steam of about 34 pounds. On the day succeeding the trial trip, the boat was inspected, and upon applying the hydrostatic test to the boiler some 30 to 40 of the braces were carried away when a pressure of only 31 or 32 pounds had been attained. A large number of additional braces were put in before the boiler would stand the required test.

"In the Third Supervising District, on one occasion, by the application of the hydrostatic test to a boiler, one of the sheets was ruptured to such an extent that an entire new sheet was required to be put in before a certificate would be given. Other instances have also occurred of a similar character but of minor importance."

Those mentioned are from the Atlantic coast inspection districts. Those from the western river and lake districts are:

"In the Fifth Supervising District there have been seven boilers ruptured in applying the hydrostatic test, and very extensive repairs have been required before certificates were granted. At one inspection the steam pipe was burst by the application of the hydrostatic test, and further examination showing that the pipes were wholly deficient in strength, new pipes were required by the inspectors. In another case, in applying the hydrostatic test, one of the flues of a *new* boiler was collapsed, and the result of further examination was a condemnation of both flues. New flues were put in before a certificate was granted. Four boilers had all their head braces torn off or broken and new braces of greater strength were required before a certificate was given by the inspectors. Three cases have occurred where the cross connection has been ruptured by the hydrostatic test, and repairs required before granting a certificate.

"In Sixth Supervising District. On submitting the boilers of one boat to the hydrostatic test, one of them was burst, and it became necessary to put in a new sheet before the inspectors would grant a certificate. In several cases have the head braces been broken or torn off when the test was applied, and new braces of greater strength were put in before the boilers were passed:

"In the Eighth Supervising District, on one occasion, upon applying the hydrostatic test, one of the flues of the boiler was collapsed, and a further examination disclosed such defects that the boiler was entirely condemned and a new one ordered. On another occasion, upon applying the test, one of the sheets of the boiler was split open, a new sheet was put in, and the test again applied before a certificate was granted:

"In the Ninth Supervising District, on one occasion, when applying the hydrostatic test to a boiler, two of the flues were collapsed to such an extent that they were required to be taken out and several new sheets substituted before a certificate would be granted. On another occasion, by the application of the test to a boiler, the steam chimney gave way so far that very extensive repairs were required. In applying the test to another boiler, so many of the braces in the furnaces and steam chimney gave away that almost entire new furnaces and chimneys were required. We should remark that the furnaces and chimneys gave way at less than the steam pressure usually carried."

The first positive rule in favor of the steam whistle over the bell for a signal was made October 9th, 1854, in these words, in part: "From the fact that the sound of the bell from various causes cannot at all times be heard, and that collisions have no doubt occurred growing out of this defect; it is, therefore, Resolved, that wherever the words "strike" or "sound" of the bell occurs in said rules and regulations aforesaid, the same shall be substituted by the words '*sounds of the steam whistle*,' and that all steamers carrying passengers and plying on the lakes and rivers flowing into the Gulf of Mexico shall be supplied with a steam whistle, properly constructed and placed and to be used for the purposes aforesaid, said regu-

lation to take effect and go into operation on the first day of January next ensuing."

In their Annual Report of October, 1855, to the Hon. James Guthrie, Secretary of the Treasury, they refer to the above rule on the steam whistle in these words: "We are gratified in being able to state that the change in the mode of giving signals by whistle instead of the bell, as directed at the last annual meeting of the Board, has operated favorably. There was at first much opposition to the change by steamboat officers, but we believe all parties are now fully satisfied of its utility, and many have so expressed themselves in the strongest terms, and that they would return to the use of the bell with great reluctance."

In their Annual Report of 1857, the Board of Supervising Inspectors state very fully some of the developments made in the execution of the law to that time, and the reasons why some changes had been made in the rules since the original rules were passed. They had now been a board for about five years, and in that time had gained a vast amount of knowledge and experience during the operation of the law, that gave their opinions much weight on questions of the inspection and navigation of steam vessels. It was at this time that the first complete rules and regulations were made for the service. The annual report referred to says, in part: "The Board of Supervising Inspectors have, in the performance of the duties assigned them by the Act of August 30th, 1852, from time to time established rules and regulations for their own conduct and that of the several boards of inspectors within the district. These rules and regulations have necessarily been added to, altered or modified as experience has shown advisable, or as new cases brought to the notice of the Board have rendered necessary.

"In many cases the Board have been in doubt as to their authority, on account of the ambiguity of the law, but whenever this has occurred their effort has in all cases been to carry out the provisions of the Act according to the true intent and meaning thereof.

"These necessary changes, modifications and additions to the rules and regulations, which have been dictated by experience, have led, in some cases, to conflicting interpretation of

such rules and regulations by the local boards, which conflicting opinions it becomes from time to time necessary for the Supervising Board to reconcile by a more lucid exposition of their own action.

"We are of opinion, however, that the time is approaching when experience in the operation of the law will not only justify but require, for a more prompt and efficient execution of its provisions, that all the rules and regulations established by this Board shall be revised, compiled and indexed for the greater convenience of the inspectors and others interested. We are fully aware that alterations and additions to these rules should be made with great caution, and only when imperatively demanded to secure the object of the law or to meet new contingencies that may arise. These alterations and additions were necessarily frequent after the law first went into effect, but are decreasing with experience; and it has been in consequence of these alterations and additions that the Board have heretofore thought it injudicious to put these regulations into more perfect arrangement and permanent form.

"Soon after this Board was organized, rules and regulations were established by them for the government of pilots, and a uniform system of lights and signals was also established, having for their object the navigating of steamers with increased safety. These rules and this system, though the necessity and propriety of alterations was discussed at the several sessions of this Board, remained unchanged until the annual meeting at Detroit, in 1854, at which time it was represented to the Board that the signal by bells, established by them for the meeting and passing of steamers navigating the Mississippi and its tributaries, were not sufficiently reliable, from the fact that, under certain circumstances of wind and weather, the signals being made by the bell could not be heard a sufficient distance to give the required information in time for safety. They therefore at that meeting, after a very thorough and careful examination, passed a resolution that all steamers upon those waters should be fitted with a steam whistle, and that the signals formerly required to be made by the bell should hereafter be given by the steam whistle. The wisdom of this change was seriously doubted by many, and caused much dissatisfaction among those in-

terested, as it was thought to force upon them an expense utterly unnecessary and useless. We are, however, gratified in being able to state that, after three years' experience in the use of the whistle as required, the great importance and value of the change is now universally admitted, and we have no doubt that the introduction of the whistle for this purpose has been the means of avoiding many collisions, the loss of much property and probably of many valuable lives.

"The rules and regulations, with the system of lights mentioned, have, with the exception of introducing the steam whistle as already stated, remained unchanged until the present time. Such, however, and so important have been the results upon the western rivers by the introduction of the steam whistle, that it has been the desire of the inspectors to bring it into general use for signals in the meeting and passing of steamers, and for other purposes. Thus, in fact, introducing a proper system, enabling pilots to converse with each other while the steamers are at a safe distance apart.

"The necessity of other modifications and additions to these rules and regulations have been strongly impressed upon us, and we have therefore at this session given special attention to this important matter, and have examined it with great care, and acted with the utmost caution, as we are well aware that changes, unless made with caution and judgment, may, for a time at least, have a tendency to produce confusion and perhaps disaster. During our present session these rules and regulations for both eastern and western rivers have been revised, modified and enlarged as the dictates of experience during the last five years have shown to be necessary. The system of lights for steamers on the eastern rivers, which has been in use unaltered for the same length of time, we have also revised during the present session, making, however, no change in the principles of the system, but simply adding to and rendering the system, as we believe, more perfect, in accordance with the results of experience. We hope and believe that the rules and regulations for the government of pilots and the system of lights, as thus revised and set forth at the present session of this Board, are so complete that little, if any, change in either will be hereafter required."

The revised rules for pilots and the system of lights on steamers, taking effect on January 1st, 1858, were as follows:

EASTERN RIVERS, AND SEA, AND LAKES.

"All pilots of steamers navigating seas, gulfs, lakes, bays or rivers (except rivers emptying into the Gulf of Mexico and their tributaries), when meeting or approaching each other, whether by day or by night, and as soon as within sight and within sound of the steam whistle, shall observe and comply with the following regulations:

"Rule I. When steamers meet 'head and head,' it shall be the duty of each to pass to the right, or on the larboard side of the other, and either pilot upon determining to pursue this course, shall give as a signal of his intention *one* short and distinct blast of his steam whistle, which the other shall answer promptly by a similar blast of the whistle. But if the course of each steamer is so far on the starboard of the other as not to be considered by the rules as meeting 'head and head,' or if the vessels are approaching in such a manner that passing to the right (as above directed) is deemed unsafe or contrary to rule by the pilot of either vessel, the pilot so deciding shall immediately give *two* short and distinct blasts of his steam whistle, which the other pilot shall answer promptly by *two* similar blasts of his whistle, and they shall pass to the left, or on the starboard side of each other.

"Note. *In the night* steamers will be considered meeting 'head and head' so long as both the colored lights of each are in view of the other. *In the day* a similar position will also be considered 'head and head.'

"Rule II. When steamers are approaching each other in an oblique direction (as shown in diagram of 5th situation), they will pass to the right, as if meeting 'head and head,' and the signal by whistle shall be given and answered promptly, as in that case specified.

"Rule III. If, when steamers are approaching each other, the pilot of either vessel fails to understand the course or intention of the other, whether from the signals being given or answered erroneously, or from other cause, the pilot so in doubt shall immediately signify the same by giving several

short and rapid blasts of the steam whistle; and if the vessels shall have approached within half a mile of each other, both shall be immediately slowed to a speed barely sufficient for steerage way, until the proper signals are given, answered and understood, or until the vessels shall have passed each other.

“Rule IV. When steamers are running in a fog or thick weather, it shall be the duty of the pilot to cause a *long* blast of the steam whistle to be sounded at intervals, not exceeding two minutes; and no steamer shall in any case be justified in coming in collision with another vessel if it be possible to avoid it.

“Rule V. Whenever a steamer is nearing a short bend or curve in the channel, where, from the height of the banks or other cause, a steamer approaching from the opposite direction cannot be seen for a distance of half a mile, the pilot of such steamer, when he shall have arrived within half a mile of such curve or bend, shall give a signal by one long blast of the steam whistle, which signal shall be answered by a similar blast given by the pilot of any approaching steamer that may be within hearing.

“Should such signal be so answered by a steamer upon the farther side of such bend, then the usual signals for meeting and passing shall immediately be given and answered. But if the *first* alarm signal of such pilot be not answered, he is to consider the channel clear and govern himself accordingly.

“Rule VI. The signals by blowing of the steam whistle shall be given and answered by pilots in compliance with these rules, not only when meeting ‘head and head,’ or nearly so, but at all times when passing or meeting at a distance within half a mile of each other, and whether passing to the starboard or larboard.

“N. B. *The foregoing rules are to be complied with in all cases, except when steamers are navigating in a crowded channel or in the vicinity of wharves; under these circumstances steamers must be run and managed with great caution, sounding the whistle as may be necessary to guard against collision or other accidents.*”

STEAMERS' LIGHTS TO PREVENT COLLISION AT NIGHT.

"Rule VII.—When under way.—All steamers rigged for carrying sail must carry a bright white light at the foremast head, and all other steamers must carry a bright white light on the stem, or near the bow, and another on a mast near the stern, or on the flag staff at the stern, the last named being at an elevation of at least twenty feet above all other lights upon the steamer. All steamers must carry a green light upon the starboard side and a red light on the port side.

"Note. Steamers, although rigged for carrying sail, instead of the foremast head light, may adopt the forward and stern lights provided for steamers not rigged for carrying sail, provided said lights are so arranged and placed on the vessel as to secure the contemplated objects.

"When at anchor.—A bright white light, at least 20 feet above the surface of the water, the lantern so constructed and placed as to show a good light all around the horizon.

"I. The mast-head light of steamers rigged for carrying sail to be visible at a distance of at least five miles in a clear, dark night, and the lantern to be so constructed as to show a uniform and unbroken light over an arc of the horizon of twenty points of the compass, viz., from right ahead to two points abaft the beam on either side of the ship.

"II. The stem and stern lights of steamers not rigged for carrying sail, to be visible at a distance of at least five miles in a clear, dark night, and the respective lanterns to be so constructed that the stem light shall show a uniform and unbroken light over an arc of the horizon of twenty points of the compass, viz., from right ahead to two points abaft the beam on either side of the ship, and that the stern lights shall show a uniform light all around the horizon.

"III. The colored side lights to be visible at a distance of at least two miles in a clear, dark night, and the lanterns to be so constructed as to show a uniform and unbroken light over an arc of the horizon of ten points of the compass, viz., from right ahead to two points abaft the beam on their respective sides.

"IV. The side lights are to be fitted with inboard screens of at least six feet in length (clear of the lantern) to prevent them being seen across the bow. The screens to be placed in

a fore and aft line with the inner edge of the side lights, and in contact therewith.

"Note. I. The objects of carrying the bright white light at the foremast head of steamers rigged for carrying sail, is merely to intimate to other vessels the approach or presence of such steamers.

"Note II. The object of the colored lights, required to be carried on all steamers, is to indicate to other vessels the course or direction such steamer may be steering.

"Note III. The object of requiring steamers not rigged for carrying sail to carry a white stern light in connection with a white light on the stem or near the bow, is to provide (when the vessel's rig will admit of it) a method of determining, by a central range of lights, more correctly the course that such vessel is running."

In 1853, the Board of Supervising Inspectors recommended, in their Annual Report, the passage of an act to include under the provisions of the law of 1852 all ferry-boats, freight-boats, tugboats and towing boats, so that their hull and machinery be inspected as other steamers, and that they be required to carry a licensed engineer and pilot. In 1855, the Board called further attention in their Annual Report to the above classes of vessels, and said, in part: "and could they be compelled to comply with the law as to show proper light and to conform to the rules established for steamers passing each other, the number of these accidents would hereafter be materially reduced. The cases of collision between passenger steamers are very rare, only nine having occurred in the whole country during the past year." In 1857, a bill was offered in Congress to include, among other provisions, the recommendations of the Supervising Inspectors, but it failed to pass that body. In 1858, the Board, in their Annual Report to the Secretary of the Treasury, speak out very plainly on the subject: "Accidents by collision are very frequent, but they rarely occur between passenger steamers inspected under the law, as the system of lights now in use under the direction of the inspectors and the regulations established by this Board for the government of pilots, and for steamers meeting and passing, are such as that collisions can scarcely occur under any circumstances. But collisions with steamers not under the law and with

sailing vessels, do often take place, and will continue to be of frequent occurrence so long as these steamers and sailing vessels are not compelled by law to take the necessary precautions by carrying lights, and by other means to avoid them.

“We would here mention that it has frequently fallen within our observation that where serious accidents have occurred to ferry-boats, tugboats, or freight steamers, the editors or correspondents of many of the newspapers and other journals throughout the country, at once censure indiscriminately either the steamboat law or the inspectors under it, or both, holding them up to the public as responsible for such accidents. By so doing these parties but show their own ignorance of the very laws they thus condemn and the duties of the inspectors they thus censure, inasmuch as these steamers are expressly and wholly excluded from the operation of the law, and the inspectors have no more authority over them or to inspect them, than the persons who thus ignorantly censure them for neglect of duty.

“We have deemed it proper to say thus much upon this point, as inspectors have frequently been censured in this way by those who, from their position, would be expected and should be better acquainted with the subject; also because many, in examining the tabular statement and report here presented, may be surprised that this, or that steamer to which disaster has occurred, either by fire, steam or collision, within their own knowledge, has not been mentioned, and may without reflection assume that the report is not full and correct. In our justification we desire simply to remark to such, that the operation of the law and the duties of the inspectors under it are confined *solely* to passenger steamers—except, indeed, in certain cases where, by special request, they may inspect a towboat or freight steamer.”

It was not until June 4th, 1864, that ferry-boats and tugboats, their pilots and engineers, were brought within the provisions of the law for the inspection of the former and license of the latter. For some reason that has not appeared on the surface, freight steamers were not brought under the law until July 25th, 1866.

The law of 1852, after passing through its experimental stage, certainly showed the firm basis upon which it was built,

for the comparatively few changes made in the law through the developments made in carrying out its provisions, showed its worth to the traveling public and to the steamboat officers as well. After the passage of the Acts of 1864 and 1866, the increase in the business of the service was so large, through the increased number of steam vessels, with a much wider range of inspection, that it was seen that further amendments to the law would be necessary very soon for the benefit of the inspection service, but it was not until 1871 that an Act of Congress was passed changing the law in many particulars, one creating a new office as Supervising Inspector General, or head of the bureau, at Washington. The first occupant of this office was Joseph Belknap, a designing marine engineer, of New York City, a man standing high in his profession, who was succeeded by Joseph Nimmo, in 1872, and, in 1873, by David D. Smith, a steamboat owner, of Nyack, N. Y., who was followed, in 1874, by William Burnett, who was the best-equipped occupant of the office, having been in the service with but a short interval from 1853, and had seen the trials of the early board of supervising inspectors in the prosecution of the law during its experimental stages. But he was too valuable a man for the service to remain long in such an office, and was succeeded by James A. Dumont in 1876. This law would seem to have been passed for the benefit of the politicians and some interests holding patent rights on fittings for marine work.

The same law also made it necessary for the first time that each master and chief mate of a steam vessel have a United States steamboat inspector's license. The fees for a license were also changed, so that each master, chief engineer and first-class pilot paid ten dollars for every certificate granted to them, and every chief mate, engineer and pilot of an inferior grade paid the sum of five dollars for every certificate granted in that grade. This law was amended in that particular by an Act of Congress, April 5th, 1882, so that each master, engineer, pilot and mate receiving a license, pay a fee of 50 cents for the same. The law of 1871 also required all seagoing steamers, and those carrying passengers on the northern and north-western lakes, to have not less than three water-tight bulkheads, to be made of plate iron, and extending to the main

deck in single deck vessels, otherwise to the deck below the main deck.

This bill of 1871 was put in form by Benj. Crawford, of Pittsburg, Pa., who was at the time a special agent of the Treasury Department, and had been one of the original Board of Supervising Inspectors under the law of 1852. He was at a later date one of the board of the Boiler Experimental Commission, to ascertain the causes of boiler explosions, and was rated as a very capable man. It was evidently the intention of the framers of the bill of 1871 that the office of Supervising Inspector General should be merely a chief clerkship to the Board of Supervising Inspectors. The bill had, before being presented to Congress, been placed in the hands of the Supervising Inspectors' Board for their examination and approval in 1870. We find in the proceedings of the Board for January, 1871, that they had a committee of the Board appointed to wait upon the Committee of Commerce of the House, asking that the bill on the steamboat inspection service, then before that body, be amended by inserting "Chief of the Steamboat Inspection Division," in lieu of "Supervising Inspector General." They desired a separate division in the Treasury Department, to be known as the Steamboat Inspection Division, and to appoint a chief fully capable to superintend the administration of the steamboat laws in a thorough and comprehensive manner, and whose duty it should be to visit from time to time the several steamboat inspection districts, under the direction of the Secretary of the Treasury, to confer with the inspectors upon matters pertaining to the service. But Congress thought different, and the bill was passed as reported by the Committee of the House, giving the title of Supervising Inspector General to the chief of the division or bureau. One of the supervising inspectors who was on the committee of the Board to whom the bill was referred in 1870, admitted in the presence of the writer, that it was generally understood at the time that the head of the service was to be the chief clerk of the supervising inspectors. The ambiguous language used for the qualifications of the chief of the service in Section 4402 of the Revised Statutes has been for many years the subject of unfavorable comment. It can be moulded into shape to suit

almost any candidate. It probably has its uses for the politicians.

There was a feeling at one time in some circles that the Board of Supervising Inspectors had served their day, and a move was made to try and have the Board abolished. But nothing came of it. With the office of Supervising Inspector General held by a politician, who would make the rules and regulations for the local inspectors and keep them up to their work, if the Board was abolished? If the former official, goodbye to all the faithful work that has been done by the supervising inspectors as a board having technical knowledge required under the law. There should be, it seems, an independent body with this knowledge, to stand between the office of the chief of the service and the local inspectors.

All fees for inspection and licensing of steam vessels, and for licenses to officers of the same, were abolished by the Act of Congress June 19th, 1886, to take effect from July 1st, 1886.

This question of fees for inspection and licenses was looked upon by many as being an unconstitutional act, as they did not think a person should be compelled to pay for carrying on a business or calling in this country. The amount collected from fees for inspection of vessels, and licenses for officers, over the cost of running the inspection service between 1871 and 1880, was stated to be about \$70,000 a year. There is believed to have been a move made at one time to have this in part refunded, but it was found to be easier to put it in the strong box of Uncle Sam than to get it out.

The Treasury Department made a determined opposition to a reduction of all fees in the service, even while there was a large annual balance to the credit of the division, with the plea that the service would not be self-sustaining.

There were placed in the law of 1871 provisions that steam vessels should be fitted with lock-up safety valves, self-recording steam gauges, that would indicate the current steam pressure, low water gauges, and several other fittings of a vessel, for the owners to provide, to comply with the law. All of the instruments and the fittings were the subjects of a patent right, and the burdens thus placed upon the steamboat owners were more than was considered just, and in some cases of very doubtful use. This was the cause of the formation of the

National Board of Steam Navigation, in 1872, that had its nucleus in the Western States, but soon were joined by the lake and the Atlantic coast merchant marine interests. The first move on the part of the steamboat owners came from an impromptu meeting of parties interested in the city of Washington, early in October, 1871. They called upon the Board of Supervising Inspectors then in session, and were much alarmed at the provisions of the new law then to be put in force. They soon found there was no relief to be had from the exactions of the new rules at the Treasury Department. They now had prepared by their executive committee an amended bill, setting forth their claims, that was presented to Congress, and after an extended hearing it was passed in the House of Representatives on April 9th, 1872, but it failed to reach a vote in the Senate. The objects they desired to obtain in amending the law of 1871 were, better safeguard for life and property; fixed and permanent rules of navigation; relief from the exactions of patent right vendors; protection from undue liability. Their labors in 1873 and 1874, respecting the progress of their bill, resulted as in 1872. It was now seen that the bill covered too much ground to be given careful attention in one session, and it was decided to confine their efforts for relief to a few of the most important items so as to reduce the length of the bill. But the shorter bill received the same treatment in the Senate as the original bill. The subject was still kept before Congress, and it is believed to have been the most thoroughly discussed measure at that period before that legislative body. The House of Representatives passed the amended bill four times in as many different Congresses. In 1878 and 1879 the questions that caused the most heated debates were those of limited liability, and the carrying of refined petroleum oil on passenger steamers.

It must be remembered there were surrounding conditions in the official situation that made it almost impossible to make progress with the bill in the Senate. The law of 1871 was mainly a product of the Treasury Department, and Hon. George S. Boutwell was Secretary of the Treasury at the time. On the expiration of his term of office in General Grant's Cabinet, in 1873, he took his seat in the United States Senate as a representative from Massachusetts. So, when the amended

bill came up for discussion in the Committee on Commerce, it was natural he should defend the law of 1871 from amendment, which course he continued during his term of office. There was also Hon. Roscoe Conklin, member of the Committee of Commerce, that stood opposed to the bill during the whole of his official career, that ended in 1881. The bill came from the committee but once, and then failed to reach a vote in the Senate.

Again, there was the railroad interests of the country that would not aid any work of this kind at that period. The new railroads, as well as the extensions of the older lines at this time, were often brought into strong competition with the steamboat lines that did not always result in the most amicable feeling between the two interests. Since then, with so much marine property under their control and operation, they see the prosecution of the steamboat law in quite another light. In 1883, there was a change in the controlling interests of the Board of Steam Navigation, and since then there have been some concessions made in the law by Congress. Still it was far from being what was claimed thirty years ago.

There is no doubt but that there were some provisions in the law of 1871 that were for the public good and the benefit of the inspection service, and some, again, of very doubtful use, as proved under trial. On the whole there may be said to have been progress made for the efficient execution of the law.

The character of our steam vessels has undergone a great change in the last thirty years, and it would seem as though the time had arrived to have the law, with its amendments, gone over by a competent body of expert engineers and masters to find if there cannot be some changes made to suit the altered conditions.

It was a move in the right direction, in a service that comes in the proper execution of the law so closely to the interests of the traveling public, to take all officials below the grade of supervising inspectors and place them under the civil-service law, for while a capable inspector may be a good politician, it is very doubtful if a politician always makes an efficient inspector, as their business training is along such different lines. There has undoubtedly been in the past many officers of ability in the service who have given their best en-

deavors to the carrying out of the provisions of the law. If competitive examinations for the places in any of the departments or bureaus of the government at Washington were necessary, it would seem as though that of the steamboat inspection service were one.

While the rules and regulations of the supervising inspectors have been along the line of safety, and it is necessary that they should be so framed as to meet all probable emergencies, still it is not all to the credit of the inspection service that we have so small an immunity from accidents of later years. The great advance that has been made by our designers in the construction of the hulls, engines and boilers of the steam vessels, and in keeping in advance of the requirements of the rules and regulations, the higher education of the officers of the vessels in their profession and line of duty, and last, but not least, the owner's desire to provide every safeguard for his property to prevent interruption to his business, if nothing more, are matters that have tended to give more safety in steam navigation of later years. Otherwise, more intelligent building and operating of our steam vessels has been a factor of no small moment in their increased safety.

The early National Board of Steam Navigation had a provision in their proposed amendments to the law of 1871 making it necessary that all foreign passenger steamers running to our ports should be inspected, same as our domestic steam vessels, as American passenger steamers running on Transatlantic lines were subject to foreign inspection laws. But Congress did not view it, or the Senate Committee at least, in the same light. At a later date they saw the wisdom and justice of the provision, and in 1882, when their eyes seem to have been opened to many just claims of the steamboat owners, an act was passed for the appointment of special foreign inspectors, an independent body from the domestic service, who held office until 1895, when Congress legislated them out of office and placed the duties of the foreign steam vessel inspection service in the hands of the regular service.

In the month of March, 1903, a reorganization of the steamboat inspection service was begun at Washington, and it were better to have begun late than never. There have been for thirty years public charges at times brought against the

service of the want of good executive ability, due to political influence in the appointments made in the service, and where there is so much smoke there is certainly some fire. If the service had been torn up root and branch by a thorough reorganization about twenty years ago, when it was thoroughly honeycombed with politics, it would have been better for the bureau. But the politicians would not permit it. It would have made but little difference then or since with the builders and owners of steam vessels, for they have been so far in advance of the steamboat inspection service for many years, that the latter have not found it possible to keep abreast of the former. The licensed officers also, under a better system, would hold a higher opinion of the examinations they must pass for their licenses.

LIFE-SAVING SERVICE.

The present United States Life-Saving Service is the outgrowth of the labors of the Massachusetts Humane Society, that was instituted for the purposes of benevolence in Boston, Mass., on January 6th, 1786, and incorporated in 1791. Its promotor "suggested the outlines of a plan of a society similar to that of the British Royal Humane Society, incorporated in 1774, in imitation of one in Holland, to restore to life persons apparently dead, etc." Of other objects that at an early period of the society engaged their attention was the erection of huts on the coast of the State for the shelter and comfort of persons that unfortunately were shipwrecked. In 1802, there were six huts on the coast, each building standing on piles, that were 8 feet long, 8 feet wide and 7 feet high, a sliding door in the building on the south side and a shutter on the west side, with a pole rising fifteen feet above the top of the building. These buildings were furnished with fuel and other articles most needful for the exhausted mariner. The contents of these huts were at times stolen from the land side, even on that comparatively uninhabited coast. In 1807, the society established its first station, fitted with a life-boat, at Cohasset, where it remained until 1813. This life-boat, from a record of the proceedings of the society, in 1829, cost them

\$1,433.11, and its dimensions were 30x11. It was in all probability of the Greathead (British) pattern, but of American construction.

In 1840, the State of Massachusetts appropriated the sum of \$5,000 for the purpose of furnishing life-boats to be stationed at the most exposed parts of the sea coast within that commonwealth, and during the next year the further sum of \$1,350 was appropriated for adding three more life-boats to the former equipment. During 1841 there were sixteen lifeboats stationed between Martha's Vineyard and Newburyport, housed and protected from the weather, and each manned by a volunteer crew when in service. All the funds for the payment of these life-boats and buildings from the State were placed at the disposal of the Massachusetts Humane Society for the object intended.

The first life-boats in the United States of which there appears any record were those of Joseph Francis, and these are described as a double or reversed-bottom boat. The bilge of the boat on each side was laid below the line of the keel, so that the bearings of the bottom of the boat were on the two bilges. There were air chambers in the space between the bilges and the floor of the boat. There were also air chambers in the bow and the stern of the boat. He also had at this time what he termed a hydrogen life-boat. There were several of the former built for the Revenue Marine Service, as well as for the merchant service, in 1838. These were all wooden-hull boats, with the exception of the air chambers, that were of copper.

In December, 1837, Congress passed a bill authorizing the employment of the naval vessels to cruise off the Atlantic coast for the relief of vessels in distress. The Secretary of the Treasury also gave the usual instructions to the Collectors of the different ports between Norfolk and Eastport to fit and send out the revenue cutters for the same purpose. The commander of the largest revenue cutter, the "Washington," was instructed to cruise along the coast between Long Island and Virginia.

There does not appear that any measures were taken to offer assistance in case of shipwrecks, in a practical form, such as we find on the New England coast, on any other portion of the Atlantic coast for many years. There was much stir for

a few years around New York when the ship "Bristol," from Liverpool for New York, was lost on Far Rockaway Beach, in November, 1836, during a heavy gale, with a loss of 63 passengers and two of the crew. And then, on January 3d, 1837, the bark "Mexico," from Liverpool for New York, with 104 passengers and a crew of 12 men, went ashore on Hempstead Bar, and only eight persons were saved, and those by a volunteer crew from the shore at a great risk of their own lives: Only a few days later, on January 14th, 1837, the ship "Tamarac," from Liverpool to New York, having 4 cabin and 113 steerage passengers and 26 in the crew, went ashore about three miles east of Fire Island Light-House. The passengers and crew were safely landed, but with great difficulty and risk. The vessel and cargo became a total loss. These losses on the southern shore of Long Island caused considerable discussion in marine circles for a time, but no permanent progress appears to have been made further than, in some cases, by increasing the number of small boats on sailing vessels.

A few of the larger vessels lost on the southern Long Island coast and the coast of New Jersey, at a later date, would be the Austrian brig "Perasto,"* from London, June 8th, 1839, for Philadelphia, Pa., that went ashore five miles south of Barnegat, N. J., in a northeast gale, on August 13th, 1839; crew of 12 men all saved, cargo recovered, but vessel a total loss. The British ship "Constitution," from Belfast, Ireland, November 26th, 1849, for New York, with 180 passengers, went ashore on January 10th, 1850, at Southampton, Long Island; passengers and crew saved, but vessel a total loss. Then the British ship "Ayrshire," from Newry, went ashore south end of the Woodlands on Squam Beach, on the night of January 12th, 1850, with 201 passengers on board, all of whom, with the crew, were saved by the use of the life-car, with one exception. The brig "Minerva," from Halifax, N. S., went ashore on Fire Island Beach, on February 10th, 1850, with the loss of four lives of the passengers; vessel was

* Mr. S. I. Kimball, General Superintendent of the Life-Saving Service, in the Senate Document No. 270 of 55th Congress, says the name of this vessel was "Terasto." The marine reports of that day give it as "Perasto."

a total loss. The most distressing and sad of all the accidents on this coast was the loss of the ship "Powhattan," of Baltimore, Md., from Havre to New York, with 311 passengers and a crew of 29 men, in a most severe gale, on April 16th, 1854, on Long Beach, about 12 miles below Barnegat Inlet. All the passengers and the entire crew were lost. The extreme severity of the storm, and the location of the vessel, being about six miles from the nearest life-saving station, made it impossible to afford them any aid before the vessel went to pieces. It was not more than 24 hours after the vessel was discovered before the whole structure was broken in pieces and floating on the water. She was about 15 years old, and of 600 or 700 tons. During the same storm the American packet ship "Underwriter," of 1,150 tons, from Liverpool for New York, with about 400 passengers, went ashore about 4 miles south of Squam Beach, or about 15 miles below Long Branch, on the 18th of the same month, but part of the passengers and crew were landed on the beach by life-boats and surf boats, and the remainder taken, a little later, on one of the large New York tugboats from the vessel, and all finally landed safe at New York. The vessel was subsequently got off. There were several smaller vessels went ashore at the time on the same coast, one being the schooner "Manhattan," of Bangor, Maine, where the crew of 9 men were lost, with one exception. This was one of the most severe storms that had visited this locality for many years, and especially for the middle of the month of April. For four days it was a northeast wind, with snow and hail, and that will be understood by those on the New England and Middle Atlantic sea coast.

In 1854, there were ten life-boat stations on the New Jersey coast between Sandy Hook and Absecom Beach, and on the southern Long Island coast there were thirteen stations from Coney Island to Montauk Point.

There was a Life-Saving Benevolent Association of New York incorporated in March, 1849, at New York City, whose object was similar to that of the Massachusetts Society, and that is still in existence. At a later date it aided in the establishment of the stations on the Long Island and the New Jersey coasts, as well as some stations on Long Island Sound.

The first metallic life-boat, as well as the metallic life-car, were built by Joseph Francis, of New York, about 1847. The latter was first brought into service on January 12th, 1850, at the wreck of the British ship "Ayrshire." In 1880, there arose a dispute between Joseph Francis and Capt. Douglass Ottinger, of the Revenue Marine Service, as to the invention of the life-car. The latter, about the time the original life-car was built by Joseph Francis, in 1847 or '48, was detailed to the establishment of the stations on the New Jersey coast, and whether he had any part in the perfection of that car by his suggestions and advice at the time it was building, seems doubtful. From the evidence to be obtained that bears on the early development of the life-car in this country, Joseph Francis appears to have the strongest claim to its invention. If Douglass Ottinger had any strong claim on the invention, how did it come that the original car, which was used in the "Ayrshire" wreck, and was the property of Joseph Francis till deposited in the Smithsonian Institute, in 1885, was permitted to be exhibited around the country and in Europe as the invention of Joseph Francis, without some means being taken to stop it, if it was a deception?

The first action taken by Congress toward the preservation of life and property from shipwreck was when the Committee on Commerce in the House of Representatives, in 1847, had an amendment made to the Light-House appropriation of \$5,000, "for furnishing the light-houses on the Atlantic coast with the means of rendering assistance to shipwrecked mariners." This measure was enacted into law March 3d, 1847. The amount remained unexpended until the fall of 1848, when it was placed at the disposal of the Massachusetts Humane Society for the Massachusetts coast. The next appropriation made was that of August 14th, 1848, for \$10,000, "for providing surf-boats, life-boats, rockets, carronades, and other necessary apparatus for the better preservation of life and property from shipwreck along the coast of New Jersey, between Sandy Hook and Little Egg Harbor, ten thousand dollars; to be expended under the supervision of such officer as may be designated by the Secretary of the Treasury for that purpose." It was through the efforts of Hon. William A. Newall, the member of the House from New Jersey, repre-

serting this Congressional District, that the appropriation was made. This may be said to have been the first step taken by the Congress toward the equipment of any stations on the coast in the vicinity of New York for life-saving purposes. In the month of March, 1849, Congress appropriated the further sum of \$20,000, one half to be expended for buildings and furnishing for the southern Long Island coast, and the remainder to extend the service on the New Jersey coast. In 1850, another appropriation of \$20,000 was made, half of this amount for additional stations on the coast of Long Island, one at Watch Hill, R. I., and the remainder for life-boats at different points on the coasts of North Carolina, South Carolina, Georgia, Florida and Texas, with buildings for their protection. Further sums were appropriated a few years later for the extension of the service on the coast, and its application on the northern lakes.

The equipment for these stations were placed without any custodian for their safety, so that in the course of a few years, from the want of proper care, they were at times found to be unserviceable, and by 1854 it was necessary to have keepers appointed for their care, and in some cases the refurnishing of the life-saving apparatus. This was about the condition the service remained in for many years, with a slight improvement at times. The boats were still manned by volunteer crews when in active use. Such administration would not be endorsed at this day.

The service thus kept on its way until 1871, when the day of its reorganization dawned. This was brought about as other bureaus of the government have been reorganized—when it has been clearly demonstrated by some occasion that the service was totally inefficient, or politically moth eaten, and that only a radical change would be of any use. This was a period when more than one bureau of the United States government went through a course of rebuilding, and some of them wanted it badly “for the benefit of the service.” To place the Life-Saving Service upon a secure and permanent basis, Congress in 1871 appropriated \$200,000, and authorized the Secretary of the Treasury to employ crews of surfmen at such stations and for such periods as he found necessary. It will be noted, all this time, the service had been in charge

of the Revenue Marine Bureau, that had other duties to perform besides life saving. Then began the labor of the building of the present system of stations, that was not done in a month or in several months. In 1872, one station for Rhode Island and nine stations for Cape Cod, Mass., were authorized by Congress; and in 1873, Congress having appropriated \$100,000 for a further extension of the life-saving service, five new stations were established on the Maine coast, one on New Hampshire coast, five on Massachusetts coast, one on Rhode Island, three on Virginia, and seven on North Carolina coast. The matter of improved equipment for the stations was one of the principal questions engaging the attention of those in authority for some years after the reorganization in 1871.

In 1878, Congress passed an Act placing the Life-Saving Service in a bureau distinct from the Revenue Marine Bureau, and the Senate confirmed the nomination of Sumner I. Kimball as its General Superintendent, who has remained at its head to the present day. Since then many improvements have been made in the equipment of the stations, new methods of work for the crews at the several stations, and new features added that have proved of much value. Politics has no place in this bureau, merit only being requisite for employment in the service. In this regard the Light-House Service and the Life-Saving Service are well-managed bureaus of the government.

The law provides that the stations on the Atlantic and the Gulf coasts shall be opened and manned for active service from August 1st to the succeeding first day of June, and those on the lakes from the opening to the close of navigation on the lakes. On the Pacific coast it has been found that the stations should be in active operation the whole year around.

CHAPTER XII.

HELL GATE.



HELL GATE received its name from Capt. Adrian Blok, who was in the employ of the East India Company, of Holland, while on a voyage from Manhattan Island to explore Long Island Sound, in the summer of 1615, in his yacht "Onrust," of 38 feet keel and 11 feet beam. He named this body of water Hellegat Riviere, after a branch of the river Scheldt, in Belgium. This was six years after Hendrick Hudson discovered the river which now bears his name.

The first survey of this dangerous channel was made by the United States Coast Survey in 1848; also one in 1849, but with no practical results. The New York Chamber of Commerce, despairing of any action being taken by Congress in the matter of the improvement of the channel, subscribed \$15,000, and accepted a proposition, in June, 1851, of Mons. Maillefert to remove by surface blasting three of the most dangerous of the reefs—Pot Rock, Frying Pan and Ways Reef. These were north of and to the eastward of Hallet's Point. Operations were carried on for about ten months, when it was found there was little increase of water over Frying Pan, but Ways Reef had an increased depth of water over it of 5 feet, and Pot Rock permitted vessels drawing 16 feet.

This surface blasting having produced good results at this period in other cases, the United States Congress, in 1852, appropriated \$20,000 for the removal of rocks at Hell Gate, and the prosecution of the undertaking was placed in the hands of the Board of Engineers of the War Department. Most all of the sum appropriated by Congress was spent on surface blasting with powder on Pot Rock. In a survey made in June, 1853, there was found a depth of water on the rock of 21 feet 4 inches at low water as the result of firing 800 charges, at a cost of \$14,963. The work was finally suspended

for the want of funds for a further prosecution of the work. This rock laid crosswise of the channel, and was 220 feet in length and 63 feet at the widest part. The city of New York, in 1856, expended \$35,600 in blasting on Diamond Reef, off Governor's Island, by this same process.

General Newton, in a report on the examination of Hell Gate for its improvement, in 1867, says, regarding these early operations: "The improvements of Hell Gate were made by exploding charges of powder placed upon the rock, no advantage being taken of submarine apparatus of any kind to establish these charges where the greatest effects might result. So long as the rock was found in isolated or separate pinnacles, this process, imperfect as it was, produced great effects. But when the projecting points were knocked away and the solid bed of the rock reached, progress became slow and doubtful, and the cost great. The small amount of the appropriation granted by Congress having been exhausted, the work has since been left in this unsatisfactory state. The rock blasted was supposed to have been blown into deep water by the force of the charge, since there was no provision made for its removal by other means; but it is evident that such results became very problematical when the area of the rock is increased and the distance to which the fragments should be removed increased.

"No reliable estimate could be framed upon such a process, even if it were sure to be attended with final success, which is more than doubtful.

"The employment of divers, which the small amount appropriated for this improvement did not justify, would have had a result more satisfactory and perhaps have furnished data for calculation. As it is, for this particular locality, no additions to our previous knowledge have been gained. The project presented to this report consists in first preparing the surface for ulterior operations by blowing off the sharp points and projections by charges placed in position by divers until the rock is reduced to a more uniform surface, then to blast the rock by introducing charges into drill holes made for the purpose, and to remove the debris by divers.

"The current, which has a maximum velocity of 8.50 miles, limits the time of working under water to a little over two

hours a day, during and about the time of slack water, and hence the time and expense, unless some means of shielding the divers and operators from the force of the current can be devised, would prove a serious objection."

In 1868, General John Newton, who had been placed in charge of the work for the improvement of the channel of Hell Gate by the War Department, submitted an estimate of the cost of blasting Pot Rock, Frying Pan, Ways Reef, Shell-drake, Heel Tap, Negro Point Rock and Hallet's Point, and removing Negro Head, Hen and Chickens and the Gridiron, and to secure 26 feet at low water, at \$8,692,645, which included the building of a sea wall of cut stone on three of the reefs, and for the floating property and machinery necessary for the prosecution of the work. This estimate was revised in 1870, based upon the process of tunneling the larger reefs, such as Hallet's Point and the Middle Reef, and removing the smaller reefs by drilling from the surface, and the cost was placed at \$4,689,820.

General Newton's plan was to cut away the rocks and reefs that lay directly in the channel to a depth of 26 feet at mean low water, and to build sea walls or dikes on some of the others which lay near the edges of the channel, in order to guide the currents and prevent them from rushing over the rocks and carrying upon them the vessels which might come within their reach. Such a wall has been built by the United States between Great and Little Mill Rocks, and New York City authorities have built a similar protecting wall on the Bread and Cheese reef at the head of Blackwell's Island.

For the removal of rock, two methods were made use of. When the rock was isolated and not of too great extent, a heavy steam-drill scow, built for the purpose, was anchored over it, the rock was drilled, blasted, and the debris were removed by steam dredges or grapples. When the rock was of great extent it was regularly mined, the mining galleries crossing each other at right angles and penetrating every part of the rock to be removed. The pillars of rock between the galleries, and the rock roof covering them, were then pierced by the pneumatic drill with blast holes, which were loaded with high explosives, and the whole mass was blown up at

one discharge and the broken rock subsequently removed by the steam dredge or grapple.

The steam-drill scow used for the removal of the isolated rocks was designed by General Newton, and consisted essentially of a hull carrying a boiler-iron dome containing the drills, which was to be lowered upon the rock to be removed when the scow was anchored over it. The hull was heavy enough to safely resist the shock of the vessels which of necessity frequently came into collision with it, when it was working in that crowded channel.

By the method of mining, 3 acres of Hallet's Point have been cut away to a depth of 26 feet at mean low water, and the Middle Reef, at Hell Gate, covering 9 acres, and including Flood Rocks and the Negro Heads, Hen and Chickens and Gridiron, have been broken up.

In the explosion at Hallet's Point, on Sunday, September 24th, 1876, nearly 50,000 pounds of high explosives, chiefly dynamite, were used, and most of the charges were connected directly with the exploding battery, only 822 out of 3,640 being unconnected and exploded by sympathy.

In the explosion at Flood Rock, on October 10th, 1885, nearly 300,000 pounds of high explosives, chiefly rack-a-rock, were used, divided among 12,561 charges, none of them being connected with the firing battery, but fired sympathetically by the explosion of 591 primary charges, distributed through the mine and connected directly with the firing battery. The mining of this rock was commenced in June, 1875.

The removal of Hallet's Point was begun in 1869, and the final blast was on September 24th, 1876. This was a day of great alarm to many people within and a few miles of New York City, for fear that the blast might be as destructive to persons and property in the vicinity as an earthquake, but it all passed off as safely as any well-conducted explosion should.

At the close of 1896 the following parts of this project had been carried out: Hallet's Point, covering 3 acres; Ways Reefs, Shelldrake, North Brother's Island Reef and Scaly Rock had been removed to the projected depth of 26 feet. Heel Tap had been broken to 26 feet and dredged to 20½ feet, and the least depths on Frying Pan and Pot Rock were 18 and 22.8 feet at mean low water, respectively. Flood Rock and con-

necting reefs, covering 9 acres, had been broken to 30 feet. The least depth over Flood Rock, Hen and Chickens and Gridiron was 20 feet at mean low water, and in the channel between Flood Rock and the Mill Rocks, 18 feet. The reef off Sunken Meadow, which originally had only 11 feet over it, had been lowered to 16 feet over main reef, and to 18 feet on the southern half.

Since 1896 there has been no prosecution of the work in Hell Gate proper further than dredging a small amount of rock, all the attention being given to removing the isolated rocks in the East River, south of Blackwell's Island. The cost of improving the navigation of Hell Gate to this date has been not far from \$5,000,000, and this has been money well invested.

Washington Irving wrote of this stream: "Being at the best of times a very violent and impetuous current, it takes these impediments in mighty dudgeon; boiling in whirlpools; brawling and fretting in ripples; raging and roaring in rapids and breakers; and, in short, indulging in all kinds of wrong-headed paroxysms. At such times, woe to any unlucky vessel that ventures within its clutches. This termagant humor, however, prevails only at certain times of tide. At low water, for instance, it is as pacific a stream as you would wish to see. But as the tide rises it begins to fret; at half-tide it roars with might and main, like a bull bellowing for more drink; but when the tide is full it relapses into quiet, and for a time sleeps as soundly as an alderman after dinner. In fact, it may be compared to a quarrelsome toper, who is a peaceable fellow enough when he has no liquor at all, or when he has a skinful, but who, when half seas over, plays the very devil."

STEAM CALLIOPE OR ORGAN.

The steam calliope or organ was the product of American genius, being the invention of J. C. Stoddard, of Worcester, Mass., who received a patent for his invention on October 9th, 1855. He was a mechanic of much ingenuity, and conceived the idea that the bells of the whistle by the vibration of whose thin edges the sound of the steam whistle is produced, could

be so arranged as to render accurately the diatonic scale in music, and after experimenting some time he succeeded in constructing a series of bells, on which seven notes of the octave could be played by steam. He also invented a new and delicate valve for the admission of the steam to the whistles. The instrument was composed of a steam chest, on top of which were arranged a number of valve chambers, according to the number of whistles, having double poppet valves. A small stem passed from each of the valves through the chamber to the outside, by which the valve could be opened on a very slight pressure. Over each valve was placed a whistle that had its own separate tone, being of different diameter and depth of bell. A cylinder with pins inserted, or driven into the wheel, like unto a music box, was so placed as to lift the valves as it revolved, and thus produced the tunes. The principle of this wheel was the same as in the music box. But there was an important difference between them. In a music box the tones are all of a length, while in the calliope they were of different lengths, as whole, half, quarters, eighths, etc., and also dotted notes, consequently the pins had to be of different shapes. Subsequently, improvements were made that permitted of the playing of the instrument through the medium of a keyboard, like a piano or an organ.

A company was formed for the manufacture of these instruments late in 1855, in Worcester, Mass., known as the American Steam Music Company, who continued business for about five years. These instruments were intended for use upon steamboats, locomotives, and with the circus and large exhibitions and shows that were permanently in business.

The first marine exhibit of the calliope was that given by the company in the waters around New York City, on August 6th, 7th, 8th and 9th, 1856. They fitted up an instrument on the large side-wheel tugboat "Union," that they had chartered, and gave two or three excursions each day around the rivers, during which time the calliope was operated for the pleasure of the passengers and also to bring it to the notice of the owners of passenger steamboats for adoption. This machine was placed on the "Glen Cove," and was the first on a passenger steamboat, as previously stated. This instru-

ment had a revolving cylinder, and was of a small size comparatively. The next steamboat in eastern waters to have a calliope on board for service, was the "Armenia," on the Hudson River, in 1858. It was built expressly for the vessel, was fitted with 34 whistles, and the keyboard was located at the after bulkhead of the engine space on the promenade deck in the main saloon. The vessel had new boilers the year before, but after this machine was installed, it was found on the bad weeks, or when they had a head tide and wanted most all the steam the boilers would furnish for the main engine, that it required much harder firing if the calliope was operated very often. Otherwise, they consumed much steam during operation. This machine was operated during some of the period of her running on the river by a Prof. Van der Wyde, who was a very skilful operator of the instrument. It was removed from the vessel prior to 1870, after her coming into the possession of Alfred Van Santvoord. It was not every skilled instrumental musician who could operate these keyboard instruments to good effect, as it required a soft and very quick touch to open and close the valve so as to obtain the best results. The next steamboat to have a calliope, and the last in operation on the coast, was the "Gen'l Sedgwick." This instrument was at the Centennial Exhibition, at Philadelphia, Pa., in 1876, and is believed to have been constructed at Cincinnati, Ohio, and was of the largest size. It remained on board the vessel until it was sold, in 1887, by the Briggs Excursion Company to the Myers Navigation Company, when the vessel was rebuilt and name changed to "Bay Queen," and as the instrument was too distinguishing a mark of her former name, it was removed. Eugene M. Newman, a musician, was the operator. The instruments on these vessels were located in a house on the hurricane deck, just in the rear of the pilot house.

The calliope was also placed on the western river steamboats at an early date. The "Amazon," a large passenger boat, built at Cincinnati, Ohio, in 1857, for the St. Louis and Illinois River trade, had one of the early instruments that was operated by a Mr. Young, an employee of the manufacturer, for some time. There were machines also placed on the steamboats "Dixie" and the "Unicorn," much smaller

boats, at a later date. In 1872, the steamboat "Chin-du-Wan," on the Sacramento River, California, had one of these instruments. There have been a few passenger steamboats on the western rivers, in the last twenty years, fitted with the steam calliope.

The largest of these instruments that have been constructed for steamboats had 34 whistles each, ranging from 1 inch diameter of bell up to 6 inches diameter of bell, and the smallest, 13 whistles, while some had 20 whistles and others 27 whistles. The large ones were operated from a keyboard, as well as by a wheel, while the smaller ones by the wheel only.

The earlier machines were made so as to be operated by any steam pressure on the boiler from which steam was taken. Consequently, if a machine was tuned at a steam pressure of 75 lbs. and then played at 60 lbs. or 90 lbs., it was not in tune. So a reducing valve was resorted to, taking steam at boiler pressure and reducing it to the pressure needed at the instrument, usually about 10 lbs. per square inch.



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